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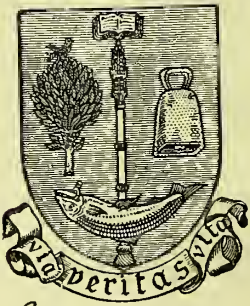

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OF

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OF

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AND

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PRECEDED BY

AN ABSTRACT OF THE THEORY OF MEDICINE,

AND

THE NOSOLOGY OF DR. CULLEN:

AND INCLUDING

UPWARDS OF SIX HUNDRED AUTHENTIC FORMULÆ,

FROM THE BOOKS OF ST. BARTHOLOMEW'S, ST. GEORGE'S,
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LONDON, AND FROM THE LECTURES AND
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THESE are ſuch as are ſlow in their progreſs, and may continue for a long time without being attended with either pain or inflammation; though occaſionally almoſt all of them may be inflamed, and ſome of them, in that ſtate, attended with conſiderable pain. They are of different kinds according to the nature of their contents, and appear in various parts of the body. They are ſeated in the adipoſe and cellular membrane; whence it often happens that they take place in the viſcera themſelves, where they are frequently mortal. Sometimes they are filled with a ſubſtance of the conſiſtence of honey, and are thence called *meliceratous* tumors; ſometimes they are filled with a harder ſubſtance, and are then called *atheromatous* tumors; at other times they are filled with a ſubſtance of the conſiſtence of fat, and are then called *ſteatomatous*. Sometimes, however, they are found to be repleniſhed with a fluid lymph coagulable by heat, and are then called *hydatids*. One kind are filled with matter like the ſynovia of the joints, and have the name of *ganglions*. A ſhort account of theſe tumors will ſuffice.

Meliceris.—This is an encyſted tumor, containing a half tranſparent fluid, reſembling honey in colour and conſiſtence; the contents of the *atheroma* are like a bread and milk poultice; and thoſe of the *ſteatoma* reſemble ſuet. From the difference in theſe fluids, and in their conſiſtence, it is evident that the feel of them will be very different; and that although a degree of fluctuation may be felt in each of them, yet this will be more obſcure in the atheroma than in the meliceris, and ſtill more in the ſteatoma. Whenever we ſee, however, any tumor, formed in any of the ſuperficial parts of the body, increaſing gradually almoſt without pain, entirely without diſcolouration, or any other ſymptom indicating ſuppuration, and in which we feel a fluctuation, we may conclude it to be a ſwelling of one of theſe kinds.

They are perfectly devoid of danger, and generally very ſmall in their firſt appearance; ſo that although there be, in general, little hope of ſucceeding in our attempt to cure them by reſolution, yet the attempt may be made properly and with ſafety. The beſt application for this purpoſe, is either crude ſal ammoniacum diſſolved in an aqueous or ſpirituous menſtruum, and applied to the part; or the volatile ſpirit ſo far diluted as to prevent it from fretting the ſkin.

Theſe applications may likewiſe be aſſiſted by preſſure, where the tumor is in any part that will admit of it, and we have known theſe means to ſucceed in ſome few inſtances, in an early ſtate of the diſeaſe. We may now and then cure the little encyſted tumor that happens frequently in the ſkin of the eye-lids, and which we have always found to be a ſteatoma, by the application of mercurial ointment.

We may therefore, unleſs they ſhould acquire ſuch a volume as to prove troubleſome, wait with ſafety to obſerve what turn theſe tumors will take, although they will not yield to reſolutive means; for the cyſts will ſometimes fall into ſuppuration, particularly that of the meliceris, and will come away by a ſimple opening of the ſkin.

Ranula.—This contains much the ſame kind of fluid as the ganglion. It is called by the French grenouillette, or rather "*grenouille*," as appears by the *Manuel Lexique des mots François dont la ſignification n'eſt pas familière à tout le monde.* "En termes de medicine, on nomme *grenouille* une petite humeur froide et viſqueuſe, qui, tombant du cerveau, ſe ramaſſe ſous la langue, dont elle rend l'uſage difficile."

It is a little tranſparent tumor ſeated under the tongue, by the ſide of the ranular artery; of greater or leſs ſize, yet ſometimes of ſuch magnitude, as to impede the motions of the tongue, and obſtruct the patient's ſpeech. Although this cyſt be divided throughout its whole length, in order to let out the fluid, the diſeaſe will be very likely to return, unleſs ſome care be taken to prevent it. One of the modes recommended for this purpoſe, and which is often effectual, is to mix a quantity of mel roſæ, with as much diluted acid of vitriol as will make it very ſour, to dip a probe in this liquid, and to rub the cyſt with it. Mr. Juſtamond once ſucceeded in curing this little diſeaſe by a different contrivance. As the patient would not ſuffer him to put a lancet into it, he directed her to make a ſtrong ſolution of alum, and dipping a piece of lint faſtened to the end of a ſkewer, to rub the tumor ſmartly every day, as long as ſhe could bear it. By following theſe directions, ſhe got rid of the ramula in a few days, though ſhe had been troubled with it a long time; and latterly, it had grown exceedingly alarming and inconvenient to her.

Wiſeman treats on this diſeaſe very fully. He ſays, "It is a ſoft tumor without pain or alteration of colour in the ſkin. It yieldeth to the impreſſion of your fingers, but riſeth upon the taking them off, and containeth a matter not unlike the white of an egg, or ſuch as we meet with in *atheroma*. It is alſo diſcovered by a croaking in the ſpeech." He ſays the cure is difficult, that the treatment ſhould be ſimilar to that of *ſtrumæ*; but if topics prove ineffectual, then recourſe muſt be had to the *actual cautery*.

Tumors of this kind are eaſily *diſtinguiſhed* from all others, as having neither heat, pain, nor pulſation, as is to be obſerved in thoſe which incline to ſuppurate; and they are diſtinguiſhed from each other, before they are laid open, by fluctuation being readily perceived in the meliceris: the atheroma is ſoft and compreſſible, but has no fluctuation; while the ſteatoma is commonly firm, and rolls under the ſkin. But theſe rules are liable to conſiderable exceptions. The meliceris and atheroma are moſt commonly found upon the head, and the ſteatoma upon the other parts of the body; while ganglions are ſituated over the tendons of the muſcles. Theſe tumors muſt be either extirpated entirely, or laid open ſo as to diſpoſe the cyſt to ſlough off or granulate. If the matter be fluid, we may evacuate it by an opening made with a lancet, or by means of a ſeton; but as the matter is apt to collect again, it is better to remove the ſac entirely. If large veſſels or nerves prevent this from being done, then it is to be laid freely open and expoſed to the air, ſo that the bag may granulate, or be thrown off. When the tumor is to be extirpated, a longitudinal inciſion is to be made through the integuments; after which the tumor may be frequently removed by the point of the finger, or by the end of a ſpatula, replacing the integuments with a view to heal by the firſt intention. In every pendulous tumor of this kind, with a narrow neck, we ought to divide the teguments near the bottom of the tumor, in an oval form, ſo that the wound may be afterwards properly covered with the remaining integuments. After the tumor is removed, the ſkin is to be replaced over the wound, and fixed with adheſive ſtraps, covering it with a pledget of cerate, and ſmall compreſs of linen, with a bandage above all, to make a gentle preſſure on the parts.

SECT. I. *Of* STEATOMATOUS *and* SARCOMATOUS TUMORS.

Steatomatous tumors have been ranked by authors among thoſe of the encyſted kind; but they have no other cyſt containing them than the common cellular ſubſtance, ſomewhat condenſed; and the particles of fat compoſing them are found of the ſame ſize with thoſe in a ſound part of the body.

Authors formerly adviſed the diſcuſſion of ſteatoms, or the prevention of their growth, by the application of preſſure; but by ſuch means the growth is rather promoted than retarded, nor have internal remedies been of any advantage. They muſt be removed therefore by an operation which is the ſame with that for the extirpation of encyſted tumors.

Sarcomatous tumors have nearly the ſame external appearance with thoſe of the ſteatomatous kind. The term has been applied, in a general way, to ſcirrhi of the glands; but ſarcomatous tumors are likewiſe found in various other parts of the body, and are diſtinguiſhed from ſteatoma by being firmer to the touch; internally they are found of a redder colour, or approaching that of muſcles, in conſequence of the greater number of veſſels entering into their ſubſtance. Theſe are to be treated in the ſame manner as ſteatoms; but the operation ought to be performed early, as they are more apt to degenerate into cancer.

SECT. II. *Of* GANGLIONS, *or Swellings of the Burſæ Mucoſæ.*

Ganglions of the tendons are likewiſe tumors of the encyſted kind, ſeated in the burſæ mucoſæ, or ſheaths of the tendons which belong to the extremities. They are moſt frequently met with over the tendons upon the back of the wriſt, and often likewiſe about thoſe of the ancle and other parts of the extremities. When preſſed, they are found to poſſeſs a conſiderable degree of elaſticity, from which, and from their ſituation, they may generally be diſtinguiſhed from other encyſted tumors. They ſeldom arrive at any great bulk, are not often attended with pain, and commonly the ſkin retains its natural appearance. On being laid open, they are found to contain a tough, viſcid, tranſparent fluid, reſembling the white of an egg.

They are generally *produced by ſprains*, or contuſions of the joints, or by rheumatiſm. In many inſtances, they go off inſenſibly, without any aſſiſtance from art; but as this is often not the caſe, means ought to be uſed for removing them. For this purpoſe, moderate friction frequently repeated, or gentle compreſſion applied to them by means of thin plates of lead, &c. ſometimes remove them. In ſome inſtances they have been removed by the application of bliſters; but the moſt certain method is, to make a ſmall puncture into the ſac, and to draw a cord through it; or, after the puncture is made, to preſs out the contents, and then inject ſome gently ſtimulating fluid, as port wine and water heated blood-warm. Sometimes, in tumors of this kind, bodies of a cartilaginous nature, and of different ſhapes and ſizes, are found; ſome quite ſmooth, others with peduncles; by which they are ſuppoſed by Dr. Monro, in his work upon burſæ mucoſæ, to have been attached to the burſæ. As theſe cannot be removed by any remedy with which we are yet acquainted, it is found neceſſary to diſcharge them. But as the parts may ſometimes ſuffer from inflammation when the tumor is laid fully open, it may be punctured at each end; and, after preſſing out the contents, a ſmall cord may be introduced; after which gentle preſſure may be applied with a compreſs and bandage over the courſe of the tumor. The cord however ſhould not be continued ſo long as to induce any great degree of inflammation, for it is found that a ſlight degree of this ſufficiently anſwers the purpoſe.

SECT. III. *Of* COLLECTIONS *within the* CAPSULAR LIGAMENTS *of* JOINTS, *and of Cartilaginous Bodies contained there.*

Collections here may conſiſt of ſerum, blood, or pus and ſynovia combined. They are moſt frequently met with in the joint of the knee, and may be produced either by internal or external cauſes. Theſe kinds of collections may in general be diſtinguiſhed from each other.

Watery effuſions, commonly called *dropſical ſwellings* of the joints, ariſe chiefly in conſequence of ſevere rheumatic complaints; and when the tumor is not very large, the fluctuation of the fluid may be felt on preſſure. When a large effuſion appears immediately after a violent bruiſe, it is probable that it conſiſts chiefly of blood: but when it ſucceeds a violent ſprain, attended with great pain, inflammation, and ſwelling, terminating in an effuſion, there is every reaſon to think that the contained fluid conſiſts of pus mixed with ſynovia.

Swellings of the joints are moſt apt to be confounded with collections in the burſæ mucoſæ, or with matter effuſed in the adjacent cellular ſubſtance. From the firſt of theſe they are generally diſtinguiſhed by the contained fluid paſſing readily from one ſide of the joint to the other, and from its being diffuſed over the whole of it; whereas, when it is contained in the burſæ, the tumor is confined to a particular part, and is ſeldom attended with much pain.

When ſuch collections can ſafely be allowed to remain, the capſular ligament ought never to be opened, as they can often be removed by diſcutients. Even conſiderable collections ariſing from rheumatiſm may commonly be diſcuſſed by friction, fomenting the parts with warm vapour, keeping them conſtantly moiſt with ſaturnine ſolutions, covering them properly with flannel, and applying bliſters. When theſe fail, ſupporting the part with a laced ſtocking, or with a roller, has frequently been of ſervice. But whether a rheumatic tumor can be diſcuſſed or not, it ought not to be opened; for the inconvenience attending it is more intolerable than the pain and inflammation which may enſue. But when the matter would do miſchief by lodging, it ſhould be diſcharged. Effuſed blood and matter which ſucceed high degrees of inflammation are of this kind. Blood is frequently extravaſated among ſoft parts without much detriment; but when in contact with cartilage or bone, it ſoon hurts them materially. The matter *ought to be diſcharged* ſo as moſt effectually to prevent the admiſſion of air into the cavity of the joint. For this purpoſe the opening ſhould be made with a trocar; and the ſkin, previouſly drawn tight to the upper part of the tumor, ſhould be pulled down immediately on withdrawing the canula. A piece of adheſive plaſter ſhould be directly laid over the opening, and the whole joint ſhould be firmly ſupported by a flannel roller properly applied. If the patient be plethoric, he ſhould be blooded to ſuch an extent as his ſtrength will bear; he ſhould be put upon a ſtrict antiphlogiſtic regimen, and in every reſpect ſhould be managed with caution; for inflammation being very apt to enſue, we cannot too much guard againſt it.

Joints are ſometimes rendered painful and ſtiff by the formation of different *ſubſtances within the capſular ligaments*. Theſe are ſometimes looſe, and as firm as cartilage; and ſometimes of a ſoft membranous nature, ſimilar to thoſe already obſerved in treating of ſwellings of the burſæ mucoſæ.

In ſome caſes theſe ſubſtances, eſpecially the laſt ſpecies, retain nearly the ſame ſituation, without being much affected either by preſſure or by the motion of the joint: in that caſe the pain is conſtant, but ſeldom ſevere. The firſt ſpecies, however, is commonly very moveable; and on being touched, they ſlip with ſuch facility that it is difficult to fix them even with the fingers. Theſe are only painful in particular ſituations.

Where theſe concretions appear, upon examination, to be perfectly looſe and detached, if the pain which they excite is very ſevere, we ſhould venture in a cautious manner to take them out, by making an inciſion into the joint. But if there is reaſon to ſuſpect that they are connected with any part of the joint, the patient ought to be adviſed to ſubmit to the pain they induce, which in general will be rendered moderate by ſhunning exerciſe; but if, notwithſtanding this, it becomes inſupportable, amputation is the only reſource.

The limb being firmly ſecured by aſſiſtants, in that poſture which admits of the body to be taken out being felt moſt diſtinctly, the ſurgeon ſhould endeavour to fix it with his fingers towards the upper part of the joint, after an aſſiſtant has drawn the ſkin as much as poſſible upwards from the part where the inciſion is to be made. The operator with a ſcalpel is now to make an inciſion through the teguments and capſular ligament, directly upon the ſubſtance itſelf, of ſuch a ſize as will admit of its being eaſily taken out; which may be done either with the finger or with the end of a blunt probe. If it is found to be connected by any ſmall filaments either to the capſular ligament or to the cartilages of the joint, they ſhould be cautiouſly divided, either with a probe-pointed biſtoury, or probe-pointed ſciſſars, after drawing the ſubſtance itſelf as far out as it can be got. When more concretions than one are found, they ſhould all be taken out at the ſame opening, when this can be done; but when it cannot, it will be better to allow the firſt inciſion to heal before attempting the ſecond, ſo as to avoid as much as poſſible the exciting of inflammation.

After the concretion is removed, the ſkin ſhould be immediately drawn over the wound in the capſular ligament; and the lips of the opening in the ſkin being laid together, they need be ſecured i this ſituation by pieces of adheſive plaſter, ſo as to prevent the ai from finding acceſs to the cavity of the joint. Till the wound b completely healed, the patient need not be confined to bed, bu the limb ſhould be kept as much as poſſible in one poſture, and ſtrict antiphlogiſtic regimen ſhould be obſerved.

To this ſection we ſhall annex ſome excellent obſervations on the looſe cartilages found in joints, and moſt commonly met with in that of the knee, publiſhed by Mr. Home, in the tranſactions of a ſociety in London eſtabliſhed for the improvement of medicine and ſurgery.

" Such detached and moveable cartilages," ſays Mr. Home, " as are the ſubject of the following obſervations, are not peculiar to the joint of the knee, they occaſionally occur in other joints of the body; but as they are moſt frequently met with in the knee, and it is in that joint they produce ſymptoms which render them the object of a chirurgical operation, I ſhall conſider them more particularly when ſituated in that cavity.

" Theſe ſubſtances, in their ſtructure, are analogous to bone, but in their external appearance bear a greater reſemblance to cartilage; they are not, however, always exactly of the ſame ſtructure, being in ſome inſtances ſofter than in others. Their external ſurface is ſmooth and poliſhed, which, being lubricated by the ſynovia, allows them to be moved readily from one part of the joint to another, ſeldom remaining long at reſt, while the limb is in motion; when they happen to be in ſuch ſituations as to be preſſed upon with force by the different parts of the joint, they occaſion conſiderable pain, and materially interfere with its neceſſary motions.

" The circumſtance of their being looſe, and having no remains of a viſible attachment, made it difficult to form conjectures reſpecting their formation; and I believe that no ſatisfactory account of their origin had been given, till Mr. Hunter's obſervations threw light upon the ſubject. The circumſtances which led him to the inveſtigation of this ſubject, appear at firſt ſight ſo foreign to the purpoſe, that they require ſome explanation.

" In the courſe of his experiments and obſervations, inſtituted with a view to eſtabliſh a living principle in the blood, Mr. Hunter was naturally induced to attend to the phenomena which took place when that fluid was extravaſated, whether in conſequence of accidental violence, or other circumſtances. The firſt change which took place he found to be coagulation; and the coagulum thus formed, if in contact with living parts, did not produce an irritation ſimilar to extraneous matter, nor was it abſorbed and taken back into the conſtitution, but, in many inſtances, preſerved its living principle, and became vaſcular, receiving branches from the neighbouring blood-veſſels for its ſupport; it afterwards underwent changes, rendering it ſimilar to the parts to which it was attached, and which ſupplied it with nouriſhment.

" In attending to caſes of this kind, he found that where a coagulum adhered to a ſurface, which varied its poſition, adapting it to the motions of ſome other part; the attachment was neceſſarily diminiſhed by the friction, rendering it in ſome inſtances pendulous, and in others breaking it off entirely. To illuſtrate this by example, I ſhall mention an inſtance which occurred in the examination of a dead body. The cavity of the abdomen was opened, to examine the ſtate of its contents, and there appeared lying upon the peritoneum a ſmall portion of red blood, recently coagulated; this, upon examination, was found connected to the ſurface upon which it had been depoſited, by an attachment half an inch long, and this neck had been formed before the coagulum had loſt its red colour. This ſteeped in water, ſo as to become white, appeared like a pendulous tumor.

" From this caſe it became eaſy to explain the mode in which thoſe pendulous bodies are formed, that ſometimes occur attached to the inſide of circumſcribed cavities; and the principle being eſtabliſhed, it became equally eaſy for Mr. Hunter to apply it under other circumſtances, ſince it is evident from a known law in the animal economy, that extravaſated blood, when rendered an organiſed part of the body, can aſſume the nature of the parts into which it is effuſed, and conſequently the ſame coagulum which in the abdomen formed a ſoft tumor, when ſituated on a bone, or in the neighbourhood of bone, forms more commonly a hard one. The cartilages found in the knee joint, therefore appeared to him to originate from a depoſit of coagulated blood upon the end of one of the bones, which had acquired the nature of cartilage, and had afterwards been ſeparated. This opinion was further confirmed by the examination of joints which had been violently ſtrained, or otherways injured, where the patients had died at different periods after the accident. In ſome of theſe there were ſmall projecting parts, preternaturally formed, as hard as cartilage, and ſo ſituated as to be readily knocked off by any ſudden or violent motion of the joint.

" This opinion Mr. Hunter mentioned for many years in his lectures, and his arguments in favour of it are ſo conſonant to the general laws by which the operations of an animal machine are regulated, as ſcarcely to require further evidence; but the following caſe exhibits ſo many facts in confirmation of his theory, that it appears to me to afford a full explanation of the proceſs above mentioned, and completely to eſtabliſh the opinion.

" A man, ſixty-eight years of age, was brought into St. George's hoſpital, on the 20th of March, 1791, with a ſimple fracture of the right thigh-bone. The fracture was ſituated about three inches below the great trochanter; it was treated in the uſual manner, but no bony union had taken place in the beginning of June, about eleven weeks after the accident, the portions of bone at that time being readily moved on each other. There being nothing in the man's general health to account for this backwardneſs in the parts to unite, he was deſired to explain whatever circumſtance he was acquainted with reſpecting himſelf, likely to throw any light upon it. This enquiry led the patient to mention, that his right os humeri had been broken three years and nine months before, but that the bones had continued diſunited, and admitted of motion more freely at that time, than immediately after the accident.

"Reſt having proved ineffectual in producing union in the thigh, and it being evident, from the circumſtance of the arm, that there was a natural backwardneſs in the conſtitution to form bony union, he was directed to walk upon crutches, and to preſs as much upon the broken thigh as the ſtate of the parts would admit, without conſiderable pain, with a view to rouſe the parts to action, forcing them by a ſpecies of neceſſity to ſtrengthen the limb. In the courſe of a fortnight there was an evident firmneſs in the bone, and in leſs than two months the patient could walk with the aſſiſtance of a ſtick. As there was ſomething uncommon in the caſe, he was allowed to remain in the hoſpital to acquire ſtrength; in this convaleſcent ſtate he was ſeized with a complaint in his bowels, which was very violent, and carried him off."

Mr. Home deſcribes the following appearances on diſſection:

"After death the thigh-bone was found firmly repaired by bony union, but the bone of the arm, an account of which is more immediately to the preſent ſubject, admitted of motion in every direction at the fractured part.

"The arm was carefully diſſected, to examine the ſtate of the fractured parts, between which there was no callus, but a large bag filled with a glairy fluid, reſembling ſynovia. The internal ſurface of this bag was ſmooth, like a capſular ligament, and its attachment to the bones was of the ſame kind: it adhered firmly to the ſurrounding parts, which were thickened and conſolidated, rendering it very ſtrong. The two ends of the bone were adapted to each other, all the irregularities having been abſorbed, and their ſurfaces were of conſiderable extent, from the fracture being oblique; the upper one was ſlightly concave, or rather had two depreſſions, with a middle ridge; the lower one was ſmaller and rounded, and was adapted to both concavities, which received it in the different motions of the parts.

"The ſurfaces of the bones fitted for motion were not completely covered with cartilage, but ſtudded over with it, and the bone was expoſed in the interſtices; a number of projecting parts, covered with cartilage, grew out from the ſurfaces, ſome exceedingly ſmall, others large. From the edges of the bones and the capſular ligaments, theſe excreſcences were larger, extremely irregular in their ſhape, broader in their attachments, ſofter in their texture, and ſerrated upon the external edge.

"*Thirty* or *forty ſmall ſubſtances*, ſimilar to thoſe above mentioned, were found looſe in the cavity, varying in ſize from that of millet-ſeed to that of a barley corn, of a roundiſh form, and ſmooth on the ſurface; the largeſt of them were more flattened, and ſerrated. Their hardneſs varied conſiderably, ſome of them being as ſoft as cartilage, others ſo ſolid as not to be pierced by a needle. Thoſe bodies muſt have been originally attached, and broken off by the friction of the parts on one another.

"The preternatural cavity which I have deſcribed, was in its nature and uſe ſimilar to the naturally formed joints of the body; theſe excreſcences and looſe bodies were its principal peculiarities, the formation of which appears to have been the reſult of the violence committed on the parts previouſly to the formation of the joint, and may be explained in the following manner.

"When the bone was broken, the ruptured veſſels poured out their contents into the interſtices of the lacerated parts, for the purpoſe of uniting them again; this, however, not taking place, it was neceſſary to accommodate the parts to their diſunited ſtate: to this end the blood, which had now become uſeleſs, was in part abſorbed, and the new joint formed. The remains of the coagulated blood, which had not given the ſtimulus for its own abſorption, underwent changes in its nature, aſſimilating it as much as poſſible to that of the ſurfaces to which it was attached, in ſome parts its texture reſembling ligament, in others being more allied to cartilage, or bone.

"When we compare theſe ſubſtances with the looſe cartilages found in the knee-joint, which are alſo produced in conſequence of accidental violence, and ſimilar in their appearance, we are naturally led to conclude that the latter originate from extravaſations of blood, altered in its nature by the parts in which it is depoſited, ſimilar to thoſe in the artificial joint above deſcribed. In both caſes they are evidently new-formed ſubſtances, and the readieſt mode by which we can account for their production, is to refer them thus to the blood, from which fluid every part of the body was originally formed.

"Theſe looſe cartilages, as they have been commonly called, although they may occur in any joint of the body, are found moſt frequently in the knee; and in this joint, from the pain and inconveniences they produce, have become the object of an operation in ſurgery.

"One or more of them may be formed in the ſame joint; I have known one inſtance in which there were three; they are commonly about the ſize of a horſe-bean, often much ſmaller, and ſometimes conſiderably larger: when very large, they do not give ſo much trouble to the patient as the ſmaller kind. A ſoldier in the 56th regiment has one nearly as big as the patella, which occaſions little uneaſineſs, being too large to inſinuate itſelf into the moving parts of the joint.

"In this diſeaſe, the removal of the looſe bodies is the only mode of relief; and it is fortunate for thoſe who are afflicted with it, that the knee joint is the moſt favourable in the body for ſuch an operation; for the cavity extends a conſiderable way beyond the moving parts of the joint, and is continued into parts, which, when divided, will more readily unite than the common capſular ligaments, and be leſs liable to communicate the inflammation that comes upon the wound to the general cavity.

" As theſe looſe bodies cannot always be found, no time can be fixed for the operation; but the patient, who will ſoon become familiar with his own complaint, muſt arreſt them when in a favourable ſituation, and retain them there till the ſurgeon can be ſent for.

" Before the operation, the limb ſhould be extended upon a table in an horizontal poſition, and ſecured by means of aſſiſtants; the looſe cartilages are to be puſhed into the upper part of the joint above the patella, and then to one ſide, the inner ſide is to be preferred, as in that ſituation only the vaſtus internus muſcle will be divided in the operation. Should there be ſeveral of theſe bodies, they muſt be all ſecured, or the operation ſhould be poſtponed till ſome more favourable opportunity, ſince the leaving of one will ſubject the patient to the repetition of an operation, not only painful, but attended with ſome degree of danger.

" The looſe bodies are to be ſecured in the ſituation above mentioned by an aſſiſtant, a taſk not eaſily performed, while they are cut upon, from their being lubricated by the ſynovia; and if allowed to eſcape into the general cavity, they may not readily, if at all, be brought back into the ſame ſituation."

It is of importance to attend to Mr. Home's inſtructions reſpecting the operation. He ſays,

" The operation conſiſts in making an inciſion upon the looſe cartilage, which it will be beſt to do in the direction of the thigh, as the wound will more readily be healed by the firſt intention. If the ſkin is drawn to one ſide, previouſly to making the inciſion, the wound through the parts underneath will not correſpond with that made in the ſkin, which circumſtance will favour their union. The inciſion upon the cartilage muſt be made with caution, as it will with difficulty be retained in its ſituation if much force is applied. The aſſiſtant is to endeavour to puſh the looſe body through the opening, which muſt be made ſufficiently large for that purpoſe; but as this cannot always be done, the broad end of an eyed probe may be paſſed under it, ſo as to lift it out, or a ſharp-pointed inſtrument may be ſtuck into it, which will fix it to its ſituation, and bring it more within the management of the ſurgeon.

" The cartilages being all extracted, the cut edges of the wound are to be brought together, and, by means of a compreſs of lint, not only preſſed cloſe to one another, but alſo to the parts underneath, in which ſituation they are to be retained by ſticking-plaſter, and the uniting bandage."

Union *by the firſt intention* being the great object after this operation, Mr. Home directs that, in order to prevent an inflammation upon the joint, the patient ſhould be kept in bed with the leg extended, till the wound unites, or at leaſt till there is no probability of inflammation taking place.

SECT. IV. *Of* SPINA BIFIDA.

Spina Bifida, is a tumor which ſometimes appears upon the lower part of the ſpine in new-born children. A fluctuation is diſtinctly perceived in it, and the fluid it contains can in ſome meaſure be preſſed in at an opening between the vertebræ. In ſome caſes this opening is owing to a natural deficiency of bone; in others, to the ſeparation of the ſpinous proceſſes of the vertebræ.

The diſeaſe proceeds from ſerum collected within the coverings of the ſpinal marrow. It is always fatal. Children labouring under it have been known to live for two or three years; but, in general, they linger and die in a few weeks. All that art has been able to do is to ſupport the tumor by gentle preſſure with a proper bandage. When a tumor of this kind is laid open or burſts, the child dies in a few hours. A tumor nearly of the ſame nature with this is ſometimes met with in different parts of the head in new-born children: it is formed by a fluid lodged beneath the membranes of the brain, which have been forced out at ſome unoſſified part of the ſkull. What we have ſaid with reſpect to the former is exactly applicable to this.

In treating on the lumbar abſceſs, Mr. Abernethy has ſuggeſted, that his mode of letting out fluids contained in ſacs by a valvular opening might prove uſeful in ſpina bifida. He deſcribes the following inſtance of this diſeaſe which occurred to him; but in it the circumſtances were ſuch, that little could be hoped for from any means that could be employed.

" A child, about four months old, was brought to St. Bartholomew's hoſpital for advice. From its ſcreaming violently at times," ſays Mr. Abernethy, " and being alſo occaſionally affected with ſtrabiſmus, I thought there might be ſome diſeaſe within the head; but yet the child ſucked heartily, and its bowels were in a natural ſtate. But the complaint which principally required attention, was a ſpina bifida; the tumor was as large as an orange, and the dura mater which formed the ſac, had protruded through a vacancy in the upper part of the ſacrum. The integuments covering the tumor were as thick and inelaſtic as the upper leather of a ſhoe, except at one part, where ulceration had lately taken place, and formed an opening through which the fluid contained in the dura mater had juſt begun to eſcape. The thickened ſtate of the integuments probably aroſe from a variety of irritating applications being employed to diſperſe the tumor. As I knew that the child muſt ſhortly periſh if nothing were done, I punctured the ſwelling at ſome diſtance from the ulcerated part, and let out ſix ounces of perfectly limpid fluid. I then cloſed the aperture by means of ſticking-plaſter, dreſſing the ſore with mild ſalve, and afterwards laying a compreſs over the whole, made a ſlight degree of preſſure on the part by applying moderately broad ſlips of ſticking-plaſter over the compreſs. Upon removing theſe dreſſings the ſecond day after the operation, I found the puncture quite healed, the ulcerated orifice cloſed, and the ſore having a healthy appearance: the ſac was now about half filled. In two days after, the ulcer was much better, and the ſac nearly full. I now again diſcharged by puncture about the ſame quantity of limpid fluid, and afterwards applied the compreſs in the ſame manner. The thickened ſkin fell into wrinkles when the fluid was let out, but ſhewed no diſpoſition to contract. The puncture was repeated every fourth day for ſix weeks, during which time the child's health continued unaffected; but the great obſtacle to recovery ſtill remained, viz. want of contractility in the ſkin, the dimenſions of which did not ſeem to have varied from what they were at firſt. The plaſter which covered one of the punctures being now by ſome accident rubbed off, the fluid continued to ooze out; nor could this orifice be afterwards brought to unite. The diſcharge gradually changed from a limpid to a puriform appearance; and in a few days the child died, but with much leſs pain, convulſion, or ſigns of inflammation, than in any caſe that I had ſeen.

" When the body was examined, I diſcovered more than one error in the formation of the ſpine and parts connected with it. There was not only a deficiency of bone, which allowed the dura mater to protrude and elevate the integuments in the manner already deſcribed, but the medulla ſpinalis, or a ſubſtance of an apparently ſimilar nature, was continued into the ſacrum, and there joined to that part of the dura mater which made the front of the bag. The nerves compoſing the cauda equina went off at their uſual place. But there were other nervous filaments which aroſe from the unnatural prolongation of the medulla ſpinalis mentioned above, and which, like it, terminated in the dura mater forming the ſac.

" In ſome caſes of ſpina bifida, the ſkin covering the tumor has not a natural texture; but in this caſe the diſeaſed ſtate of it was the effect of improper treatment. Under ſuch circumſtances, much benefit cannot be expected from this mode of treatment; but where the integuments are ſound, and naturally elaſtic, and where the malformation conſiſts merely in a defect of a ſpinous proceſs, I entertain hopes that a gradual contraction of the ſac may enſue, if it be occaſionally emptied and moderately compreſſed. This unſucceſsful caſe is related, as it ſhews, that, where the circumſtances are more favourable, the attempt at a cure may at leaſt be made without any hazard."

SECT. V. *Of* SCROFULOUS TUMORS.

We ſhall here mention only the ſurgical treatment of ſcrofulous tumors, having ſpoken of ſcrofula, and ſcrofulous *ulcers*, in other parts of this work. Some authors have recommended poultices, &c. to bring ſcrofulous tumors to ſuppuration; but the beſt practitioners have laid them aſide, becauſe they increaſe the ſoft and ſpongy ſtate of the parts, by which they are prevented from healing.

As external applications are ineffectual, it is better to allow ſcrofulous tumors to be as much expoſed as poſſible, as this frequently renders the ſubſequent ulcer more eaſily cured. The other methods recommended for diſcuſſing theſe tumors are, the internal uſe of cicuta, burnt ſponge, muriated barytes, a long-continued uſe of the cold bath, particularly of ſea-bathing, and drinking mineral or ſea water. Theſe, to produce any effect, ſhould be begun early, while the tumors are ſmall, and long perſiſted in. When the tumors come to a ſtate of ſuppuration, if they are ſeated upon the thorax or abdomen, or any of the large joints, free vent ought always to be given to the matter to prevent its burſting into theſe cavities; and when the abſceſs is large, this ſhould be done with a trocar, or by paſſing a cord through it, in order to exclude the external air. When the tumors are not ſituated upon great cavities, it is better to allow them to break of themſelves, as the ſores commonly heal more readily, and the ſcar is pretty ſimilar in both. The moſt proper applications to ſcrofulous ſores ſeem to be thoſe of the ſaturnine kind, as they diminiſh inflammation, and in ſome meaſure prevent the ſore from ſpreading. When the bones become carious, they are to be treated like carious bones from other cauſes; but amputation cannot be attended with certain advantage, as the diſeaſe proceeds from a fault in the conſtitution. After the ſores are healed up, the introduction of an iſſue may aſſiſt in preventing their return.

Tumors of a ſcrofulous nature are apt to be miſtaken for thoſe of the ſcirrhous kind, and thus may be improperly extirpated. Scrofulous tumors deeply ſeated commonly have a degree of firmneſs, which, if they happen to be ſeated near a ſuſpicious part, as cloſe by the ſide of a woman's breaſt, may give occaſion to ſuch a miſtake. But they may generally be diſtinguiſhed by the ſoftneſs even of the firmeſt kind of them, when compared with ſcirrhus. They have always a ſmooth equal ſurface; whereas ſcirrhus is ſomewhat unequal or knotty, and ſeated in the real ſubſtance of the gland; and a ſhooting pain is commonly felt in it from time to time, even from its firſt appearance. They are generally accompanied, too, with other ſymptoms of ſcrofula, which is not neceſſarily the caſe with ſcirrhus.

It is a received opinion among ſurgeons, that ſcrofulous indurations ſhould by no means be treated with topical ſtimulants, on account of the increaſed difficulty of the cure after an abſceſs has been produced by them. Mr. Underwood, whoſe remarks we ſhall next introduce, ſeems to countenance a different line of conduct.

“ I know,” ſays he, “ it is an opinion with *ſome people*, that *ſcrofulous ſwellings* ought not to be invited to ſuppuration; though not from an idea that they will heal leſs kindly in conſequence of early maturation, but ſolely from the difficulty of healing them whenever ſuppuration takes place, and the abſceſs is burſt. But ſince ſcrofulous tumors, and particularly thoſe of the neck, almoſt conſtantly end in ſuppuration at one time or other, though not at all invited to it by art; and ſince experience has proved the very conſiderable advantage of bringing them to an early and copious maturation, which both prevents ſo much of the glands being affected, and occaſions a more perfect diſſolution of that which is already diſtempered; I can confidently adviſe the early uſe of the ſuppurative epithem (conſiſting of a mixture of *honey*, *flour*, the *yolk of an egg*, and a little *yeaſt*) in preference to every other remedy, unleſs it be convenient to make trial of ſea-bathing. It will be a means of preventing many of the ſad effects of leaving theſe tumors for months, and even years to themſelves (as I have ſeen them), in habits of body ſo ill calculated to get rid of diſeaſe; and wherein medicine is univerſally acknowledged to afford ſo little aſſiſtance.

“ But ſhould a ſcrofulous tumor in this part be unuſually large, it may be treated in a ſomewhat different manner; it ſhould, however, be *ſpeedily brought to ſuppuration*, by the *epithem* already mentioned; or ſhould this be done to our hand, as it will conſequently contain a good deal of pus, the gland will thereby be already conſiderably diſſolved. On this account, there will not only be leſs occaſion for ſo bold a uſe of the precipitate, but the extent of the tumor being conſiderable, it will be of conſequence to preſerve a good deal of the ſkin, if there be no objection to doing it. Therefore, if that is not in a very bad ſtate (which it frequently, indeed, is, before large tumors ſuppurate plentifully), it will be found very convenient to open the abſceſs, by making only a puncture with a lancet, firſt at the top, and then at the bottom of the tumor, ſufficient to paſs a ſeton through it; or it may be done at once by a ſmall ſeton-needle, armed with a ſlender ſkein of cotton or ſilk. Beſides every other advantage of this method of diſcharging the matter, which will alſo be gradual, is the excluſion of air; a point ſcarcely enough attended to in the treatment of abſceſſes. The ſeton being introduced, ſhould be drawn up and down at leaſt twice every day, and ſometimes be moiſtened with ſome proper deterſive ointment; and occaſionally ſprinkled with precipitate. The conſtant irritation of the ſeton will tend to diſſolve the remaining hardneſs of the gland, far more than any common poultice, which frequently ſerves only to deſtroy the ſkin, without affording that ſtimulus to the parts underneath, which this ſore always requires. The irritation of the ſeton will alſo diſpoſe the bottom of the abſceſs to throw up healthy granulations, the moment the hardneſs is diſſolved, and the ſore will thereby heal up kindly, more expeditiouſly, and with much leſs ſcar, than could be expected from the extent of the tumor; no more than the marks of the punctures, and a little redneſs of the ſkin, as it was obſerved, remaining afterwards to be ſeen.

"Should the punctures made by the ſeton, however, not be diſpoſed to heal in a reaſonable time, after the ſilk is withdrawn (which ſhould be gradual, by removing a few threads at a time), and yet no freſh hardneſs take place, nor the diſcharge be increaſed, the little orifices may be eaſily dried up, by dreſſing them twice a-day with bits of lint dipped in a mixture, conſiſting of a little *new milk*, and a drop or two of *aq. litharg. acet.* (the *Cremor lithargyri acetati* of the Pharm. Chirurg.) which by this means will be thickened to the conſiſtence of a liniment: and becomes a very uſeful application to many other very troubleſome ulcers."

When tumors of a ſcrofulous nature, either by accident or deſign, become open ſores, they require to be treated as directed in the ſection on *ſcrofulous ulcers*. To what is there offered, however, we will add Mr. Underwood's obſervations on the application of *hydrargyrus nitratus ruber* to "theſe troubleſome ſores."

"I have now," ſays he, "for ſome time, uſed the *precipitate* with great freedom in ſcrofulous affections of the neck, and to very great advantage.—If the ſwellings are at all diſpoſed to come forward, but are not broken, or have only a ſmall orifice, I always haſten the *maturation*, and the diſſolution of the ſkin as far as it is diſeaſed (by means of the epithem already deſcribed). I am very little concerned to what extent the ſore may run, as I know I ſhall have much diſtempered gland to deſtroy underneath, and that if the latter be not effectually done, the ſore will either not heal entirely, however ſmall it may become, or will ſoon break out again. The ſcars, however, are even ſmaller, than when the ulcers are treated in the ordinary way. For the ſkin, in this part, being thin, frequently looſe, and yielding; the tumor beneath it removed, and the ſores healing up much ſooner than under the lenient method; I have known them, when cured by the above means, leave no more than a ſeam, and a little redneſs to be obſerved afterwards, without any great ſcar on the part.

"The only diſagreeable circumſtance that can attend ſuch a practice, I apprehend, is the poſſibility of a *ſalivation*, of which I can ſay only, that it has never happened to me; though before I relied ſo much on external means as I now do, I have given mercurial medicines in ſmall doſes, for ſome time, whilſt I have made uſe of precipitate daily with great freedom. Moreover, as it is very common to preſcribe ſea-water, or ſome other laxative, in theſe caſes, the riſk of a ſalivation, I imagine, will in general be very little. But ſhould even ſymptoms of it appear, every practitioner, as he will know the cauſe of it, will immediately take care not to increaſe it.

“ I am now, however, perſuaded, there will generally be little, or no occaſion, for adminiſtering mercurials inwardly, or any other medicine under the idea of an alterative (at leaſt, I am afraid, we know of none peculiarly adapted to the diſeaſe), much leſs for frequent purges, which ſerve only to reduce the vis vitæ, which, in theſe caſes, is always too languid already. I find likewiſe, that the ſores heal up as kindly without, as where mercurials. antimonials, cicuta, neutral ſalts, or ſea-water, are made uſe of; all of which I have formerly preſcribed with great freedom; and I doubt not that the plan I mean to recommend, eſpecially when this diſeaſe is confined to the neck, will be very frequently ſucceſsful in the hands of of every other gentleman, who may give a fair trial to it.

“ If the patient is unhealthy in other reſpects, ſuch medicines ſhould be directed as appear ſuitable to his complaints, when the bark will, I believe, be frequently found as uſeful as any; and I have found evident good effects from a ſtrong decoction of the woods, and crude antimony. But in a general way, I depend upon nothing ſo much as procuring a good and *early maturation of the tumors*, and ſuppuration of the diſtempered ſkin and glands, by means of the aforementioned *epithem*; a very bold and continued uſe of the precipitate; a nouriſhing diet, and as much exerciſe as the patient can well bear; eſteeming walking the beſt of all. To this end, the patient ſhould be encouraged to be continually on his feet, and abroad in the air as often as the weather will ſafely admit of it; and of whatever age he be, after beginning this exerciſe in a way that ſhall be quite agreeable, to increaſe it daily, till he ſhall go to bed every night ſomewhat fatigued. Of the advantage of this, I have had ſuch proofs, as leave me no room to doubt of the propriety of venturing to recommend it, as far as ſuch experience may be ſuppoſed capable of doing it.

“ To obtain the advantages that have been hinted from the uſe of the precipitate,” continues the author, “ ſcrofulous ulcers ſhould be *filled* with it, and if a ſlough is formed by it (which will not always be the caſe), the ſuppurative epithem is the beſt dreſſing till the ſlough is thrown off; when the precipitate ſhould be immediately repeated. The firſt, and a very early advantage, from ſuch a uſe of it, will be a change in the diſcharge, both in quantity and quality, which from having been too little, or from an abundance of corroding ſanies, will be changed to a moderate diſcharge of good and laudable pus; and the ſore, except when a ſlough is produced by the application, will always look clean. In a little time there will alſo be a favourable change in the parts contiguous to the ulcer, the ſwelling will ſubſide, and from a red and heated appearance, the ſurrounding ſkin will acquire its natural colour, and the patient himſelf, or his friends, will be able to judge of the favourable turn in his caſe.

"I have adviſed a daily uſe of the precipitate, which, indeed, I intend almoſt literally; for when a good deal of the gland has been deſtroyed, the ſore and ſurrounding ſkin will be found to contract under the uſe of it, as if an aſtringent application were made uſe of; and the parts will actually heal up to the breadth of a ſtraw, whilſt this active mineral, which has already deſtroyed a cluſter of diſtempered glands, is daily applied.

"I have elſewhere taken notice, that *electricity* has been found very ſerviceable in theſe ſores, and that it becomes ſo by communicating powers to the parts. But it will be further neceſſary to remark, that it not only forwards maturation in ſuch tumors as are previouſly diſpoſed to ſuppurate, but does it in the moſt advantageous manner, as well as expedites their healing, and often without ſo much as a ſcar. For tumors brought on by this means to ſuppuration, frequently break only into very ſmall apertures, from which, however, the matter runs very freely by the daily uſe of electricity; and when they are diſpoſed to heal, the ſkin on the ſurface becomes attached again to the parts below, and only perhaps half a dozen very ſmall ſpecks, in the form of ſo many pin-holes, remain."

The uſe of *maturating epithems* and of *precipitate to ſores*, is a revival of the practice of the celebrated Wiſeman and the ſurgeons of his time, and certainly is a practice not to be forgotten. We cannot, however, diſmiſs what has been ſaid of the propriety of bringing *ſcrofulous* tumors to ſuppuration, without obſerving that all experience (but Mr. Underwood's) ſeems to forbid it, ſo long as the tumor is in an *indolent* ſtate.

SECT. VI. *Of the* BRONCHOCELE.

This is a tumor on the forepart of the neck, ſeated between the trachea and ſkin, termed in French *goitre*. In this country it is very rare; but it is frequent among the inhabitants of the Alps, and other mountainous countries, and is ſuppoſed to be owing to the uſe of ſnow-water. It is ſeated moſt frequently in the thyroid gland; though in two caſes examined by Mr. Benjamin Bell this gland was diminiſhed from the compreſſion of the tumor, which was chiefly formed of condenſed cellular ſubſtance, with effuſions in different parts of it of a viſcid brown matter. Dr. Proſſer conſiders bronchocele as a dropſical affection of the thyroid gland; and in confirmation of this, he gives an account of a diſſection of a diſeaſed gland of this kind by Dr. Hunter, who found in it a great number of capſules filled with water. The ſwelling is at firſt ſoft, without pain or any evident fluctuation, and the ſkin retains its natural appearance; but as the tumor advances in ſize, it becomes unequally hard; the ſkin acquires a copper colour, and the veins of the neck become varicoſe; the face becomes fluſhed, and the patient complains of frequent head-achs, as well as of ſtinging pains through the body of the tumor.

Frequent frictions are found uſeful, eſpecially when employed early: ſaponaceous and mercurial plaſters, too, have in ſome caſes proved ſerviceable; and repeated bliſters have been known to retard its progreſs. In the enlarged and ſcirrhous ſtate of the tumor, no remedy yet known is powerful enough to diſcuſs it. When the diſeaſe is far advanced, the removal of the tumor by an operation muſt be attended with great danger, on account of the enlarged ſtate of the arteries, as well as its vicinity to the common carotids. It is therefore thought by ſome of the moſt experienced practitioners, that the cure ſhould rather be attempted by internal remedies; and in fact, theſe are very often found to ſucceed when the diſeaſe has not been of too long ſtanding. The following formula and the accounts annexed to it, appear in the *Pharmacopœia Chirurgica:*

(No. 52.) ℞ Spongiæ uſtæ drach. ſs.
Mucilaginis arabici gummi q. ſ.
Fiat Trochiſcus.

In the cure of the bronchocele, the internal uſe of burnt ſponge has, for ſome time, been conſidered as a moſt efficient remedy. It has been joined, by different practitioners, with many other ingredients, and adminiſtered in a variety of ſhapes. Dr. Cheston of Glouceſter has found it to ſucceed in a great number of caſes, when employed agreeably to the above formula, and ſubject to the following regulations, which certainly appear to be an improvement on the methods recommended in the *Coventry receipt*, which we ſhall preſently inſert.

When the tumor appears about the age of puberty, and before its ſtructure has been too morbidly deranged, a pill, conſiſting of a grain or two of calomel, muſt be given for three ſucceſſive nights, and, on the fourth morning, a ſaline purge. Every night afterwards, for three weeks, one of the troches ſhould, when the patient is in bed, be put under the tongue, ſuffered to diſſolve gradually, and the ſolution ſwallowed. The diſguſt at firſt ariſing from this remedy, ſoon wears off. The pills and purge are to be repeated at the end of three weeks, and the troches had recourſe to as before; and this plan is to be purſued till the tumor is entirely got the better of.

The receipt given by Mr. Wilmer as the means uſed by Dr. Bate of Coventry for the cure of his daughter, and which afterwards grew into ſo great celebrity, is much more elaborate. A bolus, including ten grains of calcined ſponge, and the like quantity of calcined cork and burnt pumice-ſtone, was ordered to be adminiſtered thus:

"The day after the moon hath been at the full, the patient is to take a vomit, and on the ſucceeding day a purge. On the third night, going to bed, the above bolus is to be placed under the tongue, and, being allowed to diſſolve gradually, is to be ſwallowed. This is to be repeated for ſeven nights, and in the forenoon of each day, a powder is to be given, conſiſting of flowers of chamomile, gentian root, and ſeeds of the leſſer centaury, each in powder, five grains. On the eighth day, the purge is to be repeated; and in the wane of the ſucceeding moon the ſame proceſs is to be commenced, and repeated a third time, unleſs the diſeaſe is cured before. The vomit is only to precede the firſt courſe of medicine."

In another recipe, the bolus conſiſted ſimply of the calcined ſponge, in the doſe directed in the troche firſt mentioned; but the directions with regard to the bitter powders, &c. were the ſame in every reſpect.

The *bronchocele* has, moſt undoubtedly, been cured in a number of inſtances by the exhibition of burnt ſponge. In common with other ſcrofulous affections, it is not difficult to ſuppoſe, that the ſtimulus given to the inteſtines by an occaſional doſe of calomel as a purge, is of ſervice; but it is a queſtion, whether the periodical diſcipline held forth in the Coventry remedy, is not of too empirical a deſcription; and whether the weak habits in which ſcrofula uſually exiſts, may not be injured by ſo free a uſe of evacuants.

Mr. Proſſer, in his account and method of cure of the bronchocele publiſhed in 1771, recommends the following remedy:

(No. 53.) ℞ Hydrarg. ſulphur. rub. ℈j.
Milleped. in pulv. trit.
Spong. uſt. ſing. gr. xv. Miſce.

This powder he directs to be taken an hour or two before breakfaſt for a fortnight or three weeks. The patient is then to abſtain from medicine for a fortnight, at the end of which he is to have recourſe to the powders as before, and alſo to take the *mercurial pill* of the old London Diſpenſatory, from five to ten grains at a doſe, according to the age and ſtrength of the patient, and according to its immediate effects on the bowels.

By the uſe of theſe remedies, he ſtates, that the tumor generally diſappeared in a month or ſix weeks; eſpecially if the patient were young and the diſeaſe recent. The millepedes in the powder, however, may no doubt be omitted, not only as being inert, but adding conſiderably to the bulk of the medicine.

Mr. Ring, a practitioner in London, communicates to the editors of the Medical and Phyſical Journal, another receipt for the cure of bronchocele, which he accompanies with the following remarks:

"Having frequently met with caſes of bronchocele, which were given up as *incurable* by thoſe who had been attending them, but yielded without much difficulty to a ſimple and ſafe remedy, I herewith ſend the formula, which I beg the favour of you to inſert in your Journal.

"I am well aware that to medical practitioners in general, burnt ſponge is known to be the baſis of the Coventry remedy, and to have been often given for this complaint; but, nevertheleſs, facts warrant me to affirm, that either the cure of the diſeaſe is not in general well underſtood, or that the means are not employed with due regularity and attention.

" I have many times known external ſtimulants, and mercurials, tried in vain; and ſometimes the ſpongia uſta itſelf inwardly given in other forms to no purpoſe; yet in the following manner it has ſucceeded:

(No. 54.) ℞. Spong. uſt. ℥ij.
Pulv. gum. Arab. ʒij.
Pulv. cinnam. ʒſs.
Syr. ſimpl. q. s. ut fiant trochiſci xxiv.

" Care muſt be taken that no more ſyrup be uſed than is abſolutely neceſſary to make the dry ingredients properly cohere; for which reaſon it muſt be added ſlowly, and the maſs muſt be beaten well. The lozenges are to be dried before the fire, on a plate that has been ſlightly oiled, to prevent them from ſticking; and muſt be kept in a bottle, or in a gallipot, tied over with ſkin.

" One of them is to be taken twice or three times a-day. I have known an inſtance where one was taken twice a-day, for a great length of time, to no purpoſe; but when the number was increaſed to three, the good effect was ſoon evident.

" Whether this medicine acts locally, and, if it acts locally, whether it is conveyed to the thyroid gland by means of abſorbents not hitherto diſcovered; or whether the thyroid gland is a mucous gland, and is ſtimulated to excretion by the action of this medicine on the neighbouring parts, I ſhall not pretend to determine. Suffice it to ſay, that I have cured a conſiderable number of perſons of the bronchocele by this remedy, ſome of whom began to ſuffer much, and to be ſeriouſly alarmed, on account of the difficulty of deglutition and reſpiration, with which their complaints were at that time attended.

" Burnt ſponge, it is well known, and has long been well known, is the moſt common remedy that is tried for the cure of this diſorder; but I have had frequent opportunities of knowing that it generally fails to effect a cure. This muſt proceed from the difference of the quantity given; or of the mode in which it is given. Some have adminiſtered it in the form of a ſoft bolus, to be diſſolved in the mouth. If its virtue depends, in any degree, upon its topical action, that muſt be very tranſient, unleſs the compoſition be dried."

Some years ago, he ſent a paper on this ſubject for publication to the editor of a Medical Journal, who expreſſed a wiſh on the ſubject of his endeavouring to aſcertain whether the ſpongia uſta really cures the diſeaſe in a ſhorter ſpace of time, when *exhibited in this manner*, than when *ſwallowed at once*. Mr. Ring makes the following remarks:

"I have made many attempts," ſays he, "to decide this point; but, owing to the obſtinacy and impatience of the perſons who have laboured under the diſorder, and other circumſtances, I have hitherto been baffled in my endeavours. The frequent occurrence of the diſeaſe, and the frequent diſappointments that attend the ordinary modes which are employed for its removal, induce me to think that the publication of this formula may be uſeful, and ought not to be longer delayed.

"In theſe troches the doſe of ſpongia uſta is a ſcruple. Some have recommended only that quantity, or perhaps only half a ſcruple, once a-day; and that only during a particular period of the moon. It is no wonder if ſo ſmall a quantity of the medicine ſhould often fail to produce a cure.

"Did not this mode of exhibiting the burnt ſponge, in ſome meaſure, create diſguſt, and excite nauſea, in many perſons of a delicate conſtitution, ſuch as is generally the lot of thoſe who labour under this complaint, a much larger quantity of the medicine might be preſcribed with perfect ſafety. The late Mr. Webb of Half-Moon-ſtreet, informed me, that he cured a large ſcirrous tumor of the abdomen, in a patient ſixteen years old, by giving a drachm of it four times a-day, till a pound was taken.

"A kind of lozenge was prepared, and ſold as a noſtrum, many years ago, by a Frenchman of the name of Barbais; in which I had great reaſon to believe burnt ſponge was a principal ingredient. Theſe lozenges were ſold at the enormous price of one guinea per pot; and each pot contained but a moderate quantity of the medicine.

"I have ſeen a conſiderable number of letters, from various parts of the kingdom, but particularly from Blandford, and that neighbourhood, deſcribing, in the ſtrongeſt terms, the wonderful cures which had been performed by this remedy. Neverthelefs, owing to the indolence of the perſon who prepared them for Barbais, who was for many years a cripple, and on his own account, after the death of the proprietor, the ſale was not ſo great as it would otherwiſe have been.

"When I laſt ſaw the perſon who prepared the medicine before alluded to, knowing that he had derived but little advantage from it of late years, owing to his being in an obſcure ſituation, that of a ſervant, and that he was of a very indolent diſpoſition, I offered to give him what I conſidered a reaſonable conſideration for his recipe, and if he would part with it on thoſe terms, to make it public; but his demands were ſo exorbitant, that I could not comply with them. He then lived with Captain Wade, and had lived many years with Colonel Wade, to whoſe father, Field Marſhal Wade, the former proprietor had been a ſervant.

"Theſe particulars concerning a medicine which merits at leaſt as high encomiums as any noſtrum of the preſent day, will not, I hope, be deemed ſuperfluous. I have great reaſon to believe, that burnt ſponge was the baſis of the compoſition, from the colour and taſte of the lozenges; and from knowing that the perſon who prepared them, frequently purchaſed and calcined a conſiderable quantity of that article."

SECT. VII. *Of* NÆVI MATERNI, CORNS, *and* WARTS.

Nævi materni are thoſe marks which frequently appear upon the bodies of children at birth, and which are ſuppoſed to originate from impreſſions made on the mind of the mother during pregnancy. They are of various forms; their colour is likewiſe various; though moſt frequently reſembling that of claret or red port-wine. Many of theſe marks are perfectly flat, and never riſe above the level of the ſkin: theſe do not require the aſſiſtance of ſurgery; but in ſome caſes they appear in the form of ſmall protuberances, which frequently increaſe to a great ſize in the courſe of a few months. They appear to be firm and fleſhy. They ſometimes hang by ſlender attachments to the contiguous parts, but more generally they are fixed by broad baſes. They may be removed with as little danger as any other tumor of the ſarcomatous kind. They are ſupplied indeed more plentifully with blood than moſt other tumors are; and even ſometimes they appear to be entirely formed by a congeries of ſmall blood veſſels; but the arteries which ſupply them may, for the moſt part, eaſily be ſecured by ligature. The operation ſhould never be long delayed; for as the ſize of the veſſels correſponds with that of the tumor, they ſometimes are ſo large as to throw out a good deal of blood before they can be ſecured. In performing it, the tumor is to be cut out, the arteries taken up, and the remaining ſkin brought as well together as the nature of the part will allow, and kept ſo by adheſive plaſter or ſuture. When the tumor is pendulous, and connected only by a narrow neck, it ſhould be extirpated by ligature.

Corns are ſmall hard tubercles, commonly ſituated on the toes or other parts of the feet, and ſometimes on the hands. They are of a horny nature. They proceed from a diſeaſed ſtate of the cuticle, occaſioned by preſſure. The part becomes hard and thickened, with a ſmall white ſubſtance in the centre, which has a diſpoſition to become prominent. It likewiſe forms a depreſſion in the ſubjacent cutis vera, and ſometimes is ſaid to penetrate it. When corns are ſituated on parts much expoſed to preſſure, they irritate the ſkin, and produce an increaſed ſenſibility of the part, and thus occaſion much pain. The beſt preventive of corns is the wearing of eaſy ſhoes, and avoiding every kind of preſſure; and unleſs this be attended to, it will be found difficult to keep free from them.

Various remedies are recommended for the cure or removal of corns. One is to bathe the part about half an hour in warm water, then to pare as much off them as poſſible without giving pain, and to apply over them any adheſive plaſter. If this treatment be frequently repeated, while preſſure from ſhoes is prevented, they generally fall off, and do not return if preſſure be afterwards avoided. Another method is to allow them to grow to ſome length through pieces of perforated leather, properly ſecured by plaſter or by any other means, and afterwards to cut round their root, by which they may for the moſt part be eaſily turned out. Or if ſuch irritating ſubſtances be applied to them as will raiſe a bliſter by ſeparating the cuticle from the cutis, the corn will be raiſed along with the cuticle, and may then be readily removed by a ſcalpel or ſciſſars. The ſurface of the cutis being now expoſed, is to be healed like any other part that has been bliſtered.

Warts are ſmall, hard, indolent tumors, with a rough ſurface, appearing on different parts of the body, chiefly the hands and face, and more commonly in young people. When they appear in advanced life they are apt to degenerate into cancer, eſpecially when of a livid colour, and with a ſmooth ſurface. If they do not prove troubleſome, nothing ſhould be done to them, as they generally either fall off or waſte gradually away. When from their ſize or ſituation they require to be removed, this, if they are pendulous or have narrow necks, is eaſily done by ligature; but if their baſes be broad, the ſcalpel or eſcharotic applications will be neceſſary. As few, however, will ſubmit to the former, the latter are generally employed. Eſcharotics of a mild nature give leaſt pain, and are leaſt apt to excite inflammation, which in theſe caſes it is difficult to remove, and are found to be quite ſufficient for the purpoſe. One of the beſt of theſe is crude ſal ammoniac: it ſhould firſt be moiſtened in water, and then well rubbed upon the warts two or three times a-day. Liquid ſalt of tartar, and ſometimes ſpirit of hartſhorn, have anſwered the ſame purpoſe: ſome recommend alſo the juice of onions. But the moſt effectual remedies of all are the *tincture of muriated iron* applied daily, or a *ſolution of nitrated ſilver* in nitric acid.

Warts appearing on the penis as a ſymptom of venereal infection, are of the ſame nature, and to be cured by the ſame means, or by a powder conſiſting of equal parts of *ſavine* and *verdigriſe*. Mercury is of no advantage here, and commonly indeed does harm. When every other part of the diſeaſe is eradicated, the warts may be removed alſo by the knife, and the parts from whence they are cut afterwards touched with lunar cauſtic, to prevent them from returning: but when this method it practiſed, the operator ought to be certain that he has removed the wart entirely, for where part has been left, the moſt formidable ſymptoms have ſometimes enſued.

SECT. VIII. *Of* POLYPI.

Polypi are pendulous, fleſhy, indolent tumors, ſo called from their ſuppoſed reſemblance to the animal of that name. They may be found in different cavities of the body, and originate from the inner membrane; but thoſe which come under ſurgical treatment are found in the noſe, mouth, throat, and outer paſſage of the ear, and in the vagina and rectum. They are divided into two claſſes; the one ſoft and compreſſible, the other extremely firm. Both of them bleed on being fretted or roughly handled. The ſoft kind ſhrivels and contracts in a dry atmoſphere (this is particularly the caſe with thoſe of the noſe); but the firm are not affected by the influence of the weather. Their colour is commonly pale and tranſparent, and ſometimes a deep red.

The pain at the commencement of the diſorder is always inconſiderable; but increaſes in thoſe of a hard nature as they increaſe in ſize. Sometimes polypi of this kind become unequal, and form ulcers over the whole ſurface, diſcharging fetid matter in conſiderable quantity. They are apt at this time, unleſs extirpated, to degenerate into cancer.

Moſt frequently they ariſe from local injury, or whatever tends to produce and ſupport an inflamed ſtate of the part. Scrofula and lues venerea, though conſidered by ſome authors as frequently giving riſe to them, ſeem only to be exciting cauſes: for in lues venerea in particular, polypi when preſent remain after the diſeaſe is cured.

The *prognoſis* muſt depend much upon their ſituation and their conſiſtence. The ſoft kind being ſeldom painful, may be removed at any period with little danger; but the hard kind are generally not only painful, but more apt to degenerate into cancer, or to return after being removed. The ſoft kind therefore may be removed in general with ſucceſs; but when polypi of a harder nature exiſt, the prognoſis will be much more unfavourable.

With reſpect to the treatment.—As long as they remain ſtationary, they are not to be touched; but when they continue to grow, we ought to uſe aſtringent remedies, eſpecially a ſtrong ſolution of alum, a decoction of oak bark, vinegar, ardent ſpirits, &c. The ſofter kinds of polypi may frequently be prevented for a long time from increaſing in ſize, and ſometimes they even become conſiderably ſmaller. Mercury has been found rather to make them worſe; cauſtic and other corroding applications have been of uſe in the ſofter kind, though they have not produced a cure. Setons have likewiſe been uſed with little advantage. It is therefore found neceſſary to have recourſe to a more effectual practice; and with this view the knife, ſciſſars, forceps, or ligature, are more generally recommended. The knife and ſciſſars may be uſed when the roots of the tumor can be readily come at; but polypi are ſeldom ſo ſituated as to render exciſion practicable; and even when they are, the hemorrhagy may be attended with conſiderable danger. The removal of a polypus by tearing or twiſting it with the forceps, Plate 1. fig. 3. is occaſionally practiſed; but as ligatures are leſs painful, and fully as effectual, they are now more generally employed. The ligatures conſiſt of wire, catgut, ſilk cord, &c. Different methods have been employed for paſſing theſe over polypi, according to their different ſituations.

When the *ligature* is to be applied, it is to be paſſed double over the tumor, and conducted to the root of it by means of the fingers or by ſlit probes, as in fig. 4. or rings, fig. 5. as may be beſt ſuited to the ſhape and ſize of the paſſage. The ends of the ligature are then to be introduced into a ſingle or a double canula, fig. 6. which is to be puſhed along the oppoſite ſide of the polypus till the end of the canula reach the root of it, when the ligature is to be drawn ſomewhat tight, and faſtened to the canula, which is to be left in the paſſage. The ligature is to be daily tightened till the tumor drop off. In this manner the largeſt polypus may be removed equally well with thoſe of a ſmaller ſize. Should any part of it remain, it may be deſtroyed by cauſtic, and different inſtruments are contrived for conducting this to the root of the tumor.

What has been ſaid of the treatment of polypi in general, readily applies to thoſe ſeated in the noſe, outward paſſage of the ear, the rectum, and the vagina. It likewiſe applies to thoſe in the throat; only that inſtead of paſſing the ligature through the mouth, it is to be paſſed through one of the noſtrils. The operator is then to introduce one or two of his fingers into the mouth, and open the doubling of the ligature, which he is to paſs over the polypus, and having preſſed it down to the root of it, to proceed as before directed.

We ſhall conclude this ſection with a caſe of polypus uteri, which is inſerted in the Memoirs of the Medical Society of London.

A woman, thirty-one years of age, miſcarried in March, 1791, when ſix months advanced in her pregnancy. At the expiration of three weeks ſhe was able to follow her uſual employment; and continued to enjoy a good ſtate of health for the ſpace of three months; when a violent flooding was occaſioned by her carrying a heavy load. This hæmorrhage, as well as an occaſional diſcharge of coagula, attended with great debility, frequently returned, at irregular intervals, during the courſe of the following winter and ſpring.

In May, 1792, whenever ſhe was in an erect poſition, a ſmall whitiſh tumor appeared at the os externum, which ſhe found it neceſſary to puſh back, whenever ſhe made water. About three weeks after, the tumor became ſo much enlarged, that ſhe could not make it recede; and in a ſhort time there appeared, on the outſide of the os externum, an enormous body, of a dark livid hue, of a very putrid ſmell, and of ſize nearly equal to a bullock's heart. This ſtate of the complaint was attended with continual thirſt, want of appetite, and ſleep.

From the uſe of fomentations and poultices, large ſloughs took place; the ſize and offenſive ſmell of the tumor were much diminiſhed; and it acquired a firmer texture, and the colour of fleſh. Her general health alſo was in ſome degree improved. The tumor ſtill continued as large as an infant's head, and approached ſomewhat to an elliptical form. Its ſurface was rather irregular, and was conſtantly kept moiſt by mucus. The pedicle was more equal in its ſurface, and more yielding to the touch: it was about an inch in length, and ſix inches in circumference. The tumor itſelf was indolent; but by its weight and preſſure occaſioned pain to the parts with which it was connected. She was at times troubled with diarrhœa and night ſweats.

On the death of the patient, which happened ſoon after, the following appearances were obſervable.

The tumor was much reduced in ſize, of a dark gangrenous hue, and when divided with the knife, proved to be a firm fleſhy ſubſtance. The bladder was rather ſcirrhous: the uterus was in a very prolapſed ſtate; the cervix being drawn down far without the labia pudendi, by the weight of the appending tumor. What therefore appeared as the neck of the tumor, conſiſted of the uterus, covered by a portion of the vagina.

No hæmorrhage occurred ſubſequent to the deſcent of the tumor. The os uteri was not to be diſcovered during the life of the patient, and after her death was not well aſcertained. The polypus was attached to the whole mouth of the womb; or, if there were any detached parts, the vagina alſo was ſo connected with the polypus, as to give ſuch an appearance. This was one, among other circumſtances, which occaſioned the complaint to be miſtaken for a caſe of inverted uterus. "In it is held out (ſay the editors) a ſerious warning to every member of the medical profeſſion, to inveſtigate the nature of diſeaſes with all poſſible care in their early ſtages. When the complaint here deſcribed, is diſcovered in time, the remedy is eaſy and well known; when it is miſunderſtood and neglected, it is likely to terminate a miſerable exiſtence by a painful death, as happened to the unfortunate ſubject of the preſent memoir."

SECT. IX. *Of the* ANTHRAX, *or* CARBUNCLE.

The anthrax or carbuncle is a dreadful tumor, which, although it frequently contains matter, is ſtill very different from an abſceſs;

ſince the matter is extremely different from that bland fluid which we call laudable pus, and which we find in a well-formed abſceſs.

The anthrax is a putrid, not an inflammatory tumor, as it has been reckoned; ſince it has many characters which clearly diſtinguiſh it from the true inflammation or phlegmon, and which render it much more ſimilar to the eryſipelas, or what may be called the ſpurious inflammation.

It is a hard circumſcribed tumor, ſeated in ſome part of the cellular or adipoſe ſubſtance, accompanied with a violent ſenſation of burning heat, inſtead of a throbbing or pulſative ſenſation, and attended with, and ſurrounded by, a diſcolouration of the ſkin, which inſtead of being red, as in the true inflammation, is of a livid purple hue, and has moſt commonly one or more black ſpots upon its ſurface. It is a peculiar character of this diſeaſe, as well as of the eryſipelas, that the patient is always very languid, and the pulſe ſo low, that it is very difficult to raiſe it by the freeſt uſe of the moſt cordial remedies.

It has been the practice of ſome ſurgeons to treat this diſeaſe by extirpation; but nothing ſurely can be more injudicious than to attempt to ſtop the progreſs of a diſeaſe ſo nearly allied to gangrene, by an ill-timed operation. Our chief dependence ſhould be on the exhibition of medicines internally. The bark in large quantity, opium, and proper cordials, as Madeira wine, &c. ſhould be given. Externally, to the part, lime ſhould be applied, and all round it lint moiſtened in vinum chalybeatum. When the tumor is of the red kind, and breaks in ſeveral places, we may very properly dilate theſe orifices, and lay them into one; but our inciſions ſhould extend no farther than juſt to remove the ſlough, without penetrating the ſound parts. In ſeveral caſes of this diſeaſe, we have ſeen extraordinary good effects follow the uſe of a poultice, compoſed of fermenting materials, calculated to generate *fixed air* in large quantity: the *cataplaſma carbonis* may probably anſwer the purpoſe beſt.

SECT. X. *Of* WENS.

The wen, or tumor of fat, which may alſo happen in any part of the body, and which modern writers have conſidered in the claſs of encyſted tumors of the ſteatomatous kind, is, however, a very different diſeaſe, and requires a very different treatment. It is, to all intents and purpoſes, nothing more than a tumor, or increaſe of the volume of the fat in a part. It is therefore perfectly ſolid, having no kind of fluctuation, as we have obſerved is the caſe with encyſted tumors, and is much more moveable and looſe than they are ever found to be. Beſides, theſe tumors have another diſtinction which reſpects their treatment; they never terminate, as the others do, in ſuppuration.

Preſſure applied, when they are as yet ſmall, ſo as to compreſs the fat which already diſtends them, and to oppoſe the farther increaſe of its bulk, we have known ſometimes, though rarely, to be effectual. When that fails, there is no other remedy but extirpation. It is ſurpriſing to ſee what an immenſe volume theſe wens will ſometimes acquire. Some of them, when ſeparated from the body, have been large enough completely to fill a large waſh-hand baſin.

There are three ways ſuggeſted for extirpating or deſtroying theſe tumors; namely, by cauſtic, by ligature, and by the knife. The uſe of the firſt is entirely inadmiſſible, unleſs the ſwelling be very ſmall, ſo that a ſingle application ſhall be ſufficient to deſtroy the whole of it at once. If this be not effected by the cauſtic, it is apt to be the means of ſetting up an irritation in the part, which makes theſe tumors degenerate into cancerous ones, to which, too frequently, they have, of themſelves, a tendency.

Again, it is ſaid by ſome, that when the baſis of a wen is very ſmall, in proportion to its bulk (which, by the way, ſeldom or never is the caſe), it may eaſily be extirpated by a ligature paſſed round it. But this, at beſt, is a very painful mode, and what is worſe, moſt commonly proves unſucceſsful; ſo that it puts the patient to very great torture to no purpoſe. It very ſeldom happens, indeed, that patients apply for relief, in theſe caſes, till the wen is grown by much too large for this mode of extirpation to be in the leaſt adviſable. They bear the diſeaſe for a great length of time, whilſt its growth continues without much inconvenience, and at laſt are only induced to obtain aſſiſtance in conſequence of the increaſed bulk, and unmanageable weight, of the tumor; except it happens to be of a cancerous nature, in which caſe it becomes very painful.

Theſe wens ought never, therefore, to be extirpated by ligature, unleſs they be of a pyriform ſhape; that is, ſmall, and hanging only by a ſlender ſtalk, in which inſtance we may comply with the apprehenſions of timorous perſons, and ſubſtitute the ligature for the knife.

An empiric once tied one of theſe enormous wens, ſituated on the belly of a woman, and the baſis of which meaſured at leaſt fifteen inches round. He had been at this work about a fortnight, when, although he had aſſiſted his ligature with eſcharotics, he had got no farther than about a quarter of an inch into the whole circumference of this immenſe tumor. The poor woman's tortures were, all this while, inexpreſſible, and ſhe had only abſtained from ſooner applying help through the ſhame of having put herſelf into ſuch improper hands. It was immediately extirpated with the knife, and diſſected from the tendons of the abdominal muſcles, to which it was fixed for a conſiderable extent. The operation was much more painful to her, than if ſhe had ſubmitted to it in the firſt inſtance, becauſe of the great inflammation raiſed upon the ſurface of the abdomen, in conſequence of the previous treatment, and which might have proved fatal had it gone on much longer.

This wenny or fatty diſeaſe ſometimes has ſeized the breaſts of women. The breaſt is attacked through its whole ſubſtance, which ſwells to an enormous ſize, and might, by ſome, be miſtaken for cancer. But the diſtinction is very evident, for beſides its being free from that kind of pain which diſtinguiſhes cancer, there is one remarkable circumſtance attending it, which is, that notwithſtanding the immenſe ſize of the breaſt, yet there is not the leaſt ſwelling or induration in the glands of the axilla; a circumſtance which, if the complaint were cancerous, would certainly accompany it. A tumor of this kind was taken off by Mr. John Hunter, with equal ſucceſs. The knowing theſe circumſtances is very neceſſary to guide us in our prognoſtic of ſuch caſes; for the wenny tumor, however large and formidable it may appear, never gives us reaſon to apprehend thoſe miſchievous conſequences which but too frequently attend the other kind of diſeaſe, though ever ſo well extirpated.

It muſt, however, be obſerved, that theſe wens themſelves (though the circumſtance happens very rarely), after they appear to have been fully extirpated, may puſh out a fungous excreſcence, which, in ſpite of all the ſurgeon's efforts to prevent it, ſhall ſoon grow to the ſize of the original tumor. A deplorable caſe of this kind occurred, where, though the tumor was extirpated a ſecond and a third time by the knife, and repeatedly by the ligature, while conſtant and perſevering attempts were made to deſtroy and keep it down by powerful eſcharotics, the patient died a miſerable victim to the diſeaſe, and the torture ſhe ſuffered from it. It therefore behoves the ſurgeon to be very attentive to the firſt ſproutings of this fungus, and, in the firſt inſtance, if it will not immediately give way to firm preſſure, to apply the arſenical cauſtic to it, which is the moſt effectual in ſuch caſes.

CHAP. VIII. Of DISEASES of the BONES.

The bones, as well as the ſofter parts, are liable to be ſwelled, either throughout their whole length, or to have tumors formed on particular parts of them.

Exoſtoſis is one ſpecies of tumor of the bone. According to Mr. Bromfield, no ſwelling ſhould be called ſo, but an excreſcence continued from a bone, like a branch from the trunk of a tree. Under this head therefore is ranked the *benign node*, which may be produced by external injury, ſuch as contuſions and fractures: it can hardly be called a diſeaſe, as pain ſeldom ſucceeds, but rather a deformity.

There are riſings or tumors obſervable on the bones which are often the conſequence of venereal virus, and are termed *tophi*, *gummi*, or *nodes*. Tophus is a ſoft tumor in the bone; and ſeems to be formed of a chalky ſubſtance, that is intermediate between the oſſeous fibres. Theſe cretaceous extravaſations are ſometimes found on the ligaments and tendons, as well as on the bone; and may ſometimes be taken out by the knife. We have many inſtances where chalk-ſtones in gouty people make their way out through the ſkin of the fingers and toes.

Gummi is a ſoft tumor on the ſurface of the bone, between it and the perioſteum; and its contents reſemble gum ſoftened, from whence it has taken its name. Poſſibly, by obſtruction in the nutrient veſſels of the bone, a rupture of ſome of them occaſions the ſerous liquor to eſcape, which, by making its way between the fibres of the bone, arrives at its ſurface; and being detained by the reſiſtance of the perioſteum, its moſt liquid parts being evaporated, and the remainder condenſed by the inflammation, and conſequently this inelaſtic covering being ſtretched, it becomes inſpiſſated, and forms this ſpecies of *exoſtoſis*, as it is generally called. When this is the cauſe, and the indiſpoſition of the habit in general got the better of, preſſure by a ſteel inſtrument, adapted to the part, is the proper cure.

The confirmed *venereal node* has the appearance of a divarication of the oſſeous fibres, probably from ſome inſpiſſated humour obſtructing the nutrient veſſels, but not extravaſated; this occaſioning an extenſion of the perioſteum, produces a violent pain, which, when nocturnal, is the characteriſtic of a venereal cauſe. When the perioſteum is thickened but the bone not affected, a courſe of mercury, by attenuating the obſtructed humour, and fitting it to be carried out of the body by the proper outlets, will often produce a perfect cure: but when the bone itſelf is diſeaſed, this method will fail. But here the diviſion of the extended perioſteum has been known to give perfect eaſe.

The uſual method, formerly, was to apply a cauſtic equal to the extent of the node, which being laid bare, required exfoliation before it could be cicatrized. If the inciſion is made early, that is, before matter be formed under the inveſting membrane, it ſeldom requires exfoliation; and, as we often find that the bone itſelf is not affected, but only the perioſteum thickened, we may be deceived even after a careful examination: it is therefore proper that the patient ſhould be pretty far advanced in a courſe of mercurial unction before even the inciſion is made; for, ſhould the tumor decreaſe, and the pain abate during the courſe, chirurgical aſſiſtance with the knife moſt likely may become unneceſſary.

A bone may become carious firſt in its internal parts; and that from external injury, as well as from a vitiated ſtate of the animal fluids. Authors ſeem not to agree to the technical term for this kind of diſeaſe of the bones; ſome calling it *cancer* or *gangrana oſſis*;

others, *ſpina ventoſa*, from the pointed exuberances uſually attendant on this diſorder of the bone; and ſome again *teredo*, from the appearance of the carious bone, like wood that is worm-eaten.

It is univerſally allowed, that this diſeaſe takes its riſe from matter being formed either in the diploe, or in the marrow: whenever obſtruction is begun in the veſſels expanded on, or terminating in, the medullary cyſts, the conſequence will be inflammation, and, if not early removed, matter will form: for this reaſon, this caſe may be called *abſceſſus in medulla*. Whenever, then, a patient complains of dull heavy pain, deeply ſituated in the bone, poſſibly conſequent to a violent blow received on the part ſome time before, though the integument appear perfectly ſound, and the bone itſelf not in the leaſt injured, we have great reaſon to ſuſpect an abſceſs in the medulla. Children of a bad habit of body, though they have not ſuffered any external injury, will often become lame, and complain of the limb being remarkably heavy; and though not attended with acute pain, yet the dull throbbing uneaſineſs is conſtant. If rigors happen during the time the patient labours under this indiſpoſition, it generally implies that matter will be formed within the ſubſtance of the bone. If the extremities of the bone complained of begin, or if it becomes enlarged throughout its whole extent, it may be known to be an abſceſſus in medulla, or true ſpina ventoſa, as it is called: if neither of theſe ſymptoms take place, the great inſenſibility of the bone in ſome ſubjects will prevent that acuteneſs of pain uſual in other parts where matter is formed, though the acrid matter is eroding the bone during the whole time it is contained within it. This matter at length having made its way through, arrives at the perioſteum, where it creates moſt violent pain, as well from its ſharpneſs as from its increaſed quantity, occaſioning an extenſion of the perioſteum. The integuments then become ſwelled and inflamed, and have a ſort of emphyſematous feel. On being examined by preſſure, the tumor will ſometimes be leſſened, from part of the matter retiring into the bone: from this appearance to the touch, moſt likely the name of *ventoſa* was added to the term *ſpina*. When we are aſſured of matter being under the perioſteum, we cannot be too early in letting it out, as it will ſave a conſiderable deal of pain to the patient, though probably it may not be of any conſiderable advantage in reſpect to the carious bone; for where the fluids in general are vitiated, no chance of cure can be expected from topical remedies; but where the conſtitution is mended, nature will ſometimes aſtoniſh us by her efforts, as the carious bone will be thrown off from the epiphyſes, or the teredines will be filled up by the oſſific matter that flows from the parts of the bone where ſome of the ſpinæ have come away.

If proper medicines are given, the patient well ſupported, and the parts kept clean and dry, patience and perſeverance will frequently give great credit to the ſurgeon. In caſe it ſhould have been thought adviſable to apply a trephine, to give free diſcharge to the matter, the waſhing it away, as well as the ſmall crumblings of the carious bone, by means of deterſive aſtringent injections, has been known to contribute greatly to the curing this kind of caries, after the habit of body in general had been mended.

Beſides thoſe above mentioned, the bones are liable to two oppoſite diſeaſes; the one termed *friabilitas*, the other, *mollities:* the former peculiar to adults, the latter more frequent in infants, though ſometimes ſeen in adults, from a cauſe not known.

The bones, when deprived of their cementing liquor, by paſſing through fire, become friable. From repeated ſalivations, and in old people, they have been rendered extremely brittle; inſomuch that in many ſubjects they have been fractured merely from their weight and the action of the muſcles; but in ſuch caſes, this is not owing to the friability of the bones, but to the loſs of ſubſtance, from the eroſion of the bone by ſomething acrimonious thrown on it; to which cauſe perhaps may be attributed the diſeaſe called *rickets* in children. The effects of ſcorbutic humour in rendering the bones ſoft in many inſtances have often been remarked.

By proper diet, gentle friction with coarſe cloths, exerciſe, and cold bathing, ricketty children will frequently get their conſtitution ſo much changed as that, by the time they arrive at the age of 20 years, there ſhall not remain the leaſt veſtige of their former diſeaſe. The epiphyſes are generally moſt affected in this ſpecies of the diſorder. For want of early attention to invalids of this ſort, we find that their bones not only become ſoft, and yield to the powers of the muſcles, but remain diſtorted the reſt of their lives, though they have acquired a perfect degree of ſolidity. In ſuch caſes, correcting the vitiated juices only will not reſtore the bones to their natural ſtate; therefore the aſſiſtance of a ſkilful mechanic is neceſſary both to ſupport the parts improperly acted on, and to alter the line of direction of the diſtorted oſſeous fibres.

Though the *curvature of the extremities*, or thickneſs of the ends of the bones near their articulations, may give the firſt alarm to thoſe who are conſtantly with children, yet there are other ſymptoms that give earlier notice than theſe; and had they been timely diſcovered by proper judges, it is highly probable that the curvature of the limbs in many children might not have happened. The belly generally becomes larger in this diſeaſe, from the increaſed ſize of the contained bowels. Nor is it unlikely but that the meſenteric glands are the firſt parts obſtructed; obſtructions of the liver, ſpleen, and pancreas, ſoon follow; the head then becomes enlarged; then a difficulty of breathing, which is generally ſuppoſed to be the effect of taking cold, ſucceeds; the ſternum is elevated and ſharp, and the thorax becomes contracted; the ſpine is protruded in ſeveral parts; the pelvis altered, according to the preſſure of the parts within, and habitual inclination of the patient, at times, to obtain that line of of direction in which the perpendicular from the centre of gravity may fall within the common baſe of the body. The extremities of the cylindrical bones, and the ends of the ribs next the ſternum, become enlarged; ſoon after this the bones in general become ſoft and flexible, yielding in ſuch directions as the ſtrongeſt muſcles determine by their actions.

The bones of children who die of this diſorder, we obſerve, are not only rendered ſoft, but the veſſels within their ſubſtance are replete with blood of a texture totally broken, and having more the appearance of thin chocolate than blood: the perioſteum in many places is ſeparated, and the intermediate ſpace between it and the bone filled with extravaſated fluid; and caries is almoſt as frequent as the ſeparation of the perioſteum. The muſcles in ſuch bodies generally appear pale and flabby.

Where the affection of the meſenteric glands is evident, Mr. Bromfield aſſerts, that after a doſe or two of the pulvis baſilicus to empty the inteſtines thoroughly, the purified crude quickſilver is by much the moſt efficacious medicine to remove obſtructions in thoſe glands. When the belly begins to ſoften and ſubſide, the chyle paſſes without interruption, and the child begins to get fleſh; then the cold bath becomes truly ſerviceable, and the decoction or cold infuſion of the Peruvian bark is a proper reſtorative; but the cold bath uſed too early, or the bark given before there is a free circulation of chyle through the lacteals, would be very injurious.

The *mollities oſſium*, in ſome caſes, may be produced from a redundancy of the oleaginous parts of the blood, or from a laxity of the ſolids, by which the fluids are not ſufficiently attenuated, nor properly blended and mixed: the conſequence of which will be obſtructed perſpiration, the habit in general loaded with groſs, phlegmatic, and ſerous humours, and the oſſific matter not united or condenſed as in a healthy ſtate. The method of cure confirms us in the cauſe of theſe ſymptoms; for, by ſtrengthening the fibrous ſyſtem, by uſing gentle exerciſe, a meat diet, good air, aromatics, and cold bathing, this kind of invalids are generally reſtored to health.

Among the diſeaſes of the bones we may likewiſe take notice of that *palſy of the lower extremities* which takes place, as is generally ſuppoſed, in conſequence of a curvature in ſome part of the ſpine. To this diſeaſe both ſexes and all ages are equally liable. When it attacks an infant of only a year or two old or under, the true cauſe of it is ſeldom diſcovered until ſome time after the effect has taken place. The child is ſaid to be uncommonly backward in the uſe of his legs, or he is thought to have received ſome hurt in the birth. When the child is of age ſufficient to have already walked, and who has been able to walk, the loſs of the uſe of his legs is gradual, though in general not very ſlow. He at firſt complains of being very ſoon tired, is languid, liſtleſs, and unwilling to move much or at all briſkly. Soon after this he may be obſerved frequently to trip and ſtumble, though there may be no impediment in his way; and whenever he attempts to move briſkly, he finds his legs involuntarily croſs each other, by which he his frequently thrown down without ſtumbling; and when he endeavours to ſtand ſtill in an erect poſture without ſupport even for a few minutes, his knees give way and bend forward. As the diſeaſe advances, it will be found that he cannot, without much difficulty and deliberation, direct either of his feet exactly to any one point; and very ſoon after this, both legs and thighs loſe a good deal of their natural ſenſibility, and become quite uſeleſs. In adults, the progreſs of the diſeaſe is much quicker, but the ſymptoms nearly the ſame.

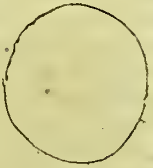
Until the curvature of the ſpine is diſcovered, the complaint generally paſſes for a nervous one; but when the ſtate of the backbone is adverted to, recourſe is almoſt always had to ſome previous violence to account for it. That this might have been the caſe in ſome few inſtances might be admitted; but in by far the greateſt number ſome prediſpoſing cauſe muſt be looked for.

Mr. Pott, who has written a treatiſe upon this diſeaſe, recommends it to our obſervation, that though the lower limbs are rendered almoſt uſeleſs, or even entirely ſo, yet there are ſome circumſtances in which it differs from a common nervous palſy. The legs and thighs, though ſo much affected, have neither the flabby feel of a truly paralytic limb; nor have they that ſeeming looſeneſs at the joints, nor the total incapacity of reſiſtance which allows the latter to be twiſted almoſt in all directions: on the contrary, the joints have frequently a conſiderable degree of ſtiffneſs, particularly the ankles; by which ſtiffneſs the feet of children are generally pointed downward, and they are prevented from ſetting them flat upon the ground.

At firſt the general health of the patient ſeems not to be at all, or at leaſt not materially, affected; but when the diſeaſe has continued for ſome time, and the curvature is thereby increaſed, many inconveniences and complaints come on; ſuch as difficulty in reſpiration, indigeſtion, pain, and what they call *tightneſs of the ſtomach*, obſtinate conſtipations, purgings, involuntary flux of urine and fæces, &c. with the addition of ſome nervous complaints, which are partly cauſed by the alterations made in the form of the cavity of the thorax, and partly by impreſſions made on the abdominal viſcera.

Mr. Pott was led to a knowledge of the true cauſe and cure of this diſeaſe, from obſerving the caſe of a youth of fourteen, who was reſtored to the uſe of his limbs immediately after a ſeemingly accidental abſceſs near the part. From this he was inclined to think, that the curvature of the ſpine was not the original cauſe of the diſorder, but that the ſurrounding parts were prediſpoſed towards it by ſome affection of the ſolids and fluids there; and he was confirmed in theſe ſuſpicions by a variety of appearances, which he obſerved both in the living body and upon diſſection of the ſubject after death; all which are narrated at full length in his treatiſe upon this ſubject.

"The remedy," ſays he, "for this moſt dreadful diſeaſe conſiſts merely in procuring a large diſcharge of matter, by ſuppuration, from underneath the membrana adipoſa on each ſide of the curvature, and in maintaining ſuch diſcharge until the patient ſhall have perfectly recovered the uſe of his legs. To accompliſh this purpoſe, I have made uſe of different means, ſuch as ſetons, iſſues made by inciſion, and iſſues made by cauſtic; and although there be no very material difference, I do upon the whole prefer the laſt. A ſeton is a painful and a naſty thing: beſides which, it frequently wears through the ſkin before the end for which it was made can be accompliſhed. Iſſues made by inciſion, if they be large enough for the intended purpoſe, are apt to become inflamed, and to be very troubleſome before they come to ſuppuration; but openings made by cauſtic are not in general liable to any of theſe inconveniences, or at leaſt not ſo frequently nor in the ſame degree: they are neither ſo troubleſome to make or maintain. I make the eſchars about this ſize and ſhape on each ſide the curve, taking care to leave a ſufficient portion of ſkin between them. In a few days, when the eſchar begins to looſen and ſeparate, I cut out all the middle, and put into each a large kidney bean: when the bottoms of the ſores are become clean by ſuppuration, I ſprinkle, every third or fourth day, a ſmall quantity of finely powdered cantharides on them, by which the ſores are prevented from contracting, the diſcharge increaſed, and poſſibly other benefit obtained. The iſſues I keep open until the cure is complete; that is, until the patient recovers perfectly the uſe of his legs, or even for ſome time longer; and I ſhould think that it would be more prudent to heal only one of them firſt, keeping the other open for ſome time; that is, not only until the patient can walk, but until he can walk firmly, briſkly, and without the aſſiſtance of a ſtick: until he can ſtand quite upright, and has recovered all the height which habit, or rather the neceſſity of ſtooping, occaſioned by the diſtemper, had made him loſe.



CHAP. IX. OF BLOOD-LETTING.

SECT. I. *Of* GENERAL BLOOD-LETTING.

BLOOD-LETTING is performed either to leſſen the quantity of circulating fluid, or to relieve a particular part: hence we have the terms of *general* and *local* blood-letting.

General blood-letting is either performed upon a vein or an artery; and from this circumſtance ariſe the appellation of *phlebotomy* and *arteriotomy*.

Local or topical blood-letting is performed by ſcarificators and cupping-glaſſes, by leeches, or by punctures made with a lancet, as may be moſt ſuitable to the nature of the diſeaſe it is intended to remedy.

There are ſome general rules and obſervations which relate equally to this operation in whatever part of the body it is practiſed: theſe we ſhall in the firſt place enumerate, and ſhall afterwards proceed to treat particularly of blood-letting in the arm and other parts.

1. In this, as in every other operation, the ſituation of the patient, and of the operator likewiſe, ought to be preciſely fixed. The ſituation of the patient, during the operation of blood-letting, has a conſiderable influence on the effects produced, and therefore merits particular attention. In ſome diſorders, it is the object of this remedy to evacuate a conſiderable quantity of blood without inducing fainting: when this is the caſe, and when from former experience it is known that the patient is liable during the evacuation to fall into a faintiſh ſtate, a horizontal poſture ought to be preferred to every other; for fainting is not near ſo ready to occur in a horizontal as in an erect poſture. It now and then happens, however, that one material advantage expected from the operation of blood-letting, is the production of a ſtate of deliquium; as, for inſtance, in caſes of ſtrangulated hernia, where a general relaxation of the ſyſtem is ſometimes deſirable. In all ſuch circumſtances, inſtead of a horizontal poſture, the more erect the patient is kept the more readily will a ſtate of fainting be induced. The patient ought to be ſo placed, that the principal light of the apartment ſhall fall directly upon the part to be operated upon, that the vein to be opened may be rendered as apparent as poſſible.

2. The patient being properly ſeated, the next ſtep, by means of a proper bandage of ſilk, linen, or woollen cloth, which has more elaſticity, is ſo to compreſs the vein intended to be opened, as to prevent the blood from returning to the heart. An equal degree of preſſure ought to be applied to all the other veins of the part: for if this be not attended to, the communication preſerved by the collateral correſponding branches would render the preſſure upon any one particular vein of very little importance. This preſſure upon the veins, by inducing an accumulation of their contents, tends to bring them more evidently into view, and conſequently renders it eaſier for the operator to effect a proper opening than he would otherwiſe find it. The preſſure, however, ought never to be carried ſo far as to obſtruct the circulation in the correſponding arteries, otherwiſe no diſcharge of blood can take place. When we ſee that it has the effect of raiſing the veins, while at the ſame time the pulſation of the artery is diſtinctly felt in that part of the member which lies on the ſide of the ligature moſt diſtant from the heart, we may be certain that it is to a very proper degree,

and that it ought not to be carried farther; for by the ſwelling of the veins we are ſure that they are ſufficiently compreſſed; and by the arteries continuing to beat, it is evident that a continued flow of blood may be expected.

3. The reflux of blood to the heart being in this manner prevented, the next queſtion to be determined is, the beſt method of making an opening into the vein. Different inſtruments have been invented for this purpoſe; but there are two only which have been retained in uſe, and which are all, therefore, that here require to be mentioned. Theſe are the lancet and the phlegm. This laſt, on being placed immediately on the part to be cut, is, by means of a ſpring, puſhed ſuddenly into the vein, and produces an opening of the exact ſize of the inſtrument employed

When it is determined to employ the lancet, which is by far the ſafeſt, the form of that inſtrument is next the object of attention. The broad-ſhouldered lancet ought to be laid entirely aſide; becauſe the broadneſs of its ſhoulders produces always a wound in the external teguments of, perhaps, three times the ſize of the opening made in the vein; a circumſtance which adds no advantage whatever to the operation; on the contrary, it produces much unneceſſary pain, renders it frequently a very difficult matter to command a ſtoppage of the blood, and the wounds produced by it are commonly ſo extenſive as to be liable to terminate in partial ſuppurations.

The ſpear-pointed lancet, on the contrary, is in every reſpect well calculated for the purpoſe of veneſection, From the acuteneſs of its point, it enters the teguments and vein with very little pain; which is with many patients a circumſtance of no ſmall importance. We are ſure of making the opening in the vein equal, or nearly ſo, to the orifice in the external teguments; and the diſcharge of blood produced by an opening made with one of theſe lancets, is commonly put a ſtop to with great eaſe immediately on removing the ligature upon the vein.

4. The form of the lancet being thus fixed upon, we come now to ſpeak of the method of uſing it. The ſurgeon and patient being both properly ſeated, and the ligature having been applied for a ſhort ſpace of time, in order to produce ſome degree of ſwelling in the veins, that vein is to be made choice of which, at the ſame time that it appears conſpicuouſly enough, is found to roll leſs than the others on being preſſed by the fingers. It is ſcarcely thought neceſſary to obſerve here, that when a vein appears to be ſo immediately connected with a contiguous artery or tendon, as evidently to produce ſome riſk of wounding theſe parts in the operation, another vein not liable to ſuch hazard, if it can be procured, ought undoubtedly to be preferred. Veins may lie directly above both arteries and tendons, and yet no manner of riſk be incurred by opening them, provided the operator is ſufficiently ſteady and at-

tentive; but it does now and then happen, that veins are ſo nearly and intimately connected with theſe parts, as to render it hazardous even for the moſt dexterous ſurgeon to attempt this operation.

The vein being at laſt made choice of, the ſurgeon, if he is to uſe his right-hand in the operation, takes a firm hold of the member from whence the blood is to be drawn with his left, and with the thumb of the ſame hand he is now to make ſuch a degree of preſſure upon the vein, about an inch and a half below the part where the orifice is to be made, as not only to render the ſkin and teguments ſomewhat tenſe, but at the ſame time to interrupt, for a little, all communication between the under part of the vein and that portion of it lying between the ligature and the thumb placed as thus directed.

The lancet being drawn out ſo as to form nearly a right angle with the ſcales, the operator now takes it between the finger and thumb of his right hand; and leaving at leaſt one half of the blade uncovered, he reſts his hand on the middle-finger, ring-finger, and little-finger, all placed as conveniently as poſſible in the neighbourhood of the vein from whence the blood is to be taken; and having puſhed the point of the inſtrument freely through the ſkin and teguments into the vein, he now carries it forward in an oblique direction, till the orifice is of the ſize he inclines to have it; taking care, during the time of puſhing on the lancet, that its point be kept in as ſtraight a direction as poſſible, for fear of dipping into the parts below.

The inſtrument is now to be withdrawn; and the ſurgeon, removing the thumb of his left hand, is to allow the vein to empty itſelf freely into the veſſel previouſly provided for the purpoſe.

It is of importance to obſerve, that during the time the blood is diſcharging, the member ought to be kept in exactly the ſame poſture it was in when the lancet was firſt introduced: otherwiſe the orifice in the ſkin is apt to ſlip over the opening in the vein; a circumſtance which always proves inconvenient, and on ſome occaſions produces a good deal of trouble, by the blood from the vein inſinuating itſelf into the ſurrounding cellular ſubſtance.

5. When the vein is properly cut, and the orifice is made ſufficiently large, it rarely occurs that any difficulty is experienced in procuring all the blood that is wanted. But when this laſt circumſtance occurs, from the patient becoming faint, a ſtream of freſh air ought to be admitted to the apartment, wine or ſome other cordial ſhould be adminiſtered, and the patient ought to be laid in a horizontal poſture. By theſe means the faintiſhneſs will in general be ſoon removed: but if ſtill the blood ſhould not flow freely, the member ought to be put in all the variety of poſitions that can probably aſſiſt in bringing the openings of the ſkin and other teguments to correſpond with that of the vein; which will ſoon be known to have happened by the blood beginning inſtantly

to flow. Throwing the muſcles of the part into conſtant action, by giving the patient a cane or other firm ſubſtance to turn frequently round in his hand when the operation is done in the arm, will often anſwer in producing a conſtant flow of blood from a vein when every other means has failed: and, laſtly, when the pulſe in the inferior part of the member is felt very feeble, or eſpecially if it cannot be diſtinguiſhed at all, we may be thereby rendered certain that the ligature is too tight, and may in general have it in our power to produce an immediate flow of blood, by removing the compreſſion thus improperly made upon the arteries of the part.

6. A quantity of blood proportioned to the nature of the diſorder being thus diſcharged, the preſſure upon the ſuperior part of the vein ſhould be immediately removed; and this being done, if the ſpear-pointed lancet has been uſed, all farther loſs of blood will in general ſtop immediately. The contrary of this, however, ſometimes occurs, and blood continues to flow freely even after the ligature is removed. When this is the caſe, the operator ought to compreſs the vein both above and below the orifice, by means of the finger and thumb of one hand, ſo as to prevent any further loſs of blood. This being done, and the orifice being cleared of every particle of blood, the ſides of it ſhould be laid as exactly together as poſſible; and a piece of court or any other adheſive plaſter being ſo applied as to retain them, it will ſeldom happen that any kind of bandage is neceſſary: but when the blood has iſſued with uncommon violence during the operation, and has been difficult to command after the removal of the ligature, in ſuch inſtances it will be prudent to apply a ſmall compreſs of linen over the plaſter, and to ſecure the whole with a linen roller properly applied round the member.

SECT. II. *Of* VENÆSECTION *in* DIFFERENT PARTS *of the* BODY.

When venæſection is to be performed in the arm, the ligature for ſtopping the circulation ought to be placed about an inch or an inch and a half above the joint of the elbow, and brought twice round: in order to prevent the ends of it from interfering with the lancet, the knot ſhould be made on the outſide of the arm. In general, one knot might anſwer; but a ſlip-knot being made above the firſt, renders it more ſecure, and it is very eaſily done.

In making choice of a vein from whence the blood is to be taken, the general rules we have already laid down upon this point muſt be particularly attended to. In general the artery lies ſo low in this place, that the median baſilic vein, under which it commonly runs, may be opened with perfect ſafety; and as this vein in general appears more conſpicuous than any of the others, probably from the continued pulſation of the artery below obſtructing in ſome meaſure the paſſage of its contents, it is in this reſpect, therefore, more properly calculated for this operation than any of the others. Other circumſtances occur too which render the median baſilic preferable to the cephalic or median cephalic veins for the operation of blood-letting. The former, viz. the median baſilic, is leſs deeply covered with cellular ſubſtance; and by lying towards the inner part of the arm, it is more thinly covered with the tendinous expanſion of the biceps muſcle than any of the others. From theſe circumſtances, the operation is always attended with leſs pain when done in this vein than in any of the others.

In very corpulent people, it ſometimes happens that all the larger veins lie ſo deep as not to be diſcovered by the eye; but when they are ſenſibly felt by the fingers, even although they cannot be ſeen, they may be always opened with freedom. In a few inſtances, however, they can neither be diſtinguiſhed by the eye nor by the finger: in ſuch a ſituation, as they may in general be met with about the wriſt or on the back-part of the hand, the ligature ſhould be removed from the upper part of the arm; and being applied about half way between the elbow and wriſt, the veins below will thereby be brought into view; and wherever a vein can be evidently obſerved, there can be no danger in having recourſe to the operation.

We have, in another place, ſpoken fully of the *miſchiefs which occaſionally happen from bleeding in the arm*, and have there given the opinions of Mr. Hunter and others as to their ſuppoſed cauſe; notwithſtanding this, it is impoſſible to overlook the ingenious remarks made on this ſubject by Mr. Abernethy, one of the ſurgeons of St. Bartholomew's hoſpital, in one of his ſurgical eſſays. After noticing the confuſed and general way in which moſt of thoſe who have written on it have treated the ſubject, Mr. Abernethy proceeds, in the following way, to lay down *ſeveral diſtinct cauſes* from which inconveniences from phlebotomy may ariſe to the patient. Theſe are,

1. *Inflammation of the integuments, and of the ſubjacent cellular ſubſtances.*—"The inflammation, and ſuppuration of the cellular ſubſtance," ſays he, "in which the vein lies, is the moſt frequent occurrence. Of this every ſurgeon muſt have ſeen repeated inſtances; they may alſo have remarked, that on the ſubſidence of this inflammation, the tube of the vein is free from induration: neither does the ſtate of any of the ſurrounding parts, indicate their previous participation in the diſeaſe. The nature of every excited inflammation will vary as the cauſe which produced it, and the conſtitution of the patient determine, it will therefore be unneceſſary to particularly notice the varieties of its appearance. Sometimes the inflammation will be more indolent, and will produce a circumſcribed, and ſlowly ſuppurating tumor. Sometimes it will be more diffuſed, partaking more of the nature of eryſipelas: and ſometimes its vio-

lence, and rapid termination, will evidently diſtinguiſh it to be a phlegmon.

"If the lancet with which the patient was bled, ſhould have been bad; if it lacerated rather than cut the parts through which it paſſed; if the conſtitution of the patient be irritable; and more particularly, if ſufficient attention be not paid to procure the union of the divided parts, but the motion of the arm be allowed: the irritation, which the friction of the oppoſite edges of the wound muſt occaſion, will moſt probably excite inflammation. The treatment proper to be purſued in this complaint is manifeſt, and diſtinguiſhed by no peculiarity; I ſhall therefore poſtpone what I have to ſay on that ſubject, until I have noticed the other varieties of theſe diſeaſes."

2. *Inflammation of the abſorbing veſſels.*—"The next frequent complaint, which I have ſeen, is inflammation of the abſorbents: it however ſometimes accidentally happens, that one ſurgeon meets with many caſes of a ſimilar nature, ſo that were he to judge merely from his own obſervation, he might conclude that diſeaſe to be common, when the collected experience of others would determine it to be a rare occurrence. I am inclined to ſuſpect, that my obſervation has been thus partial, ſince Mr. Hunter has not publicly noticed this complaint. I think I cannot give a better hiſtory of the commencement, appearances, and event of this diſeaſe, than by relating three caſes, of the circumſtances of which I took an account. It is right, however, to mention, that I have ſeen two others, of which I took no minutes; and which I am unwilling to relate only from recollection."

Of miſchief from this cauſe, Mr. Abernethy preſents us with the following caſes.

CASE I. "A lady was bled in the *vena mediana baſilica*; the wound did not heal, nor was ſufficient attention paid to preſerve the arm quiet. Eight days afterwards I was conſulted, in conſequence of the patient being alarmed by the appearance of two ſwellings; one was ſituated about the middle of the arm, over the large veſſels, the other on the fore-arm, about the mid ſpace between the elbow and wriſt, in the integuments above the flexor muſcles. The upper ſwelling meaſured rather more in circumference than an egg, the other was of ſmaller dimenſions; they were not very painful; they were moderately firm in their texture, and ſo exactly reſembled thoſe tumors which form round irritated lymphatics, that no doubt could be entertained of their nature. The orifice made by the lancet was not healed, the integuments for about one-fourth of an inch ſurrounding it were, in a ſlight degree, inflamed and thickened. No induration of the venal tube could be diſtinguiſhed either at this time, or after the ſubſidence of inflammation.

"The account which I obtained from the patient of the attack of this complaint was, that the wound inflamed, became painful, and diſcharged matter; that the gentleman by whom ſhe was bled had dreſſed it with ſalve, but did not reſtrain her from uſing her arm; that about five days after the operation ſhe had felt pains ſhooting from the orifice, in lines, up and down her arm, and upon preſſing in the courſe of this pain, its degree was increaſed. This account induced me to examine the arm attentively, and I could plainly feel two indurated abſorbents, leading to the ſuperior tumor, but could not perceive any extending to the lower one. The wounded part was dreſſed with mild ſalve; a bread and milk poultice was applied to both tumors; and the arm was ſupported by a ſling, without motion or exertion. The integuments ſurrounding the orifice loſt their diſpoſition to inflame, and the wound gradually healed; during five days the tumors underwent no evident alteration; the poultice was changed to one of bread, water, and acetum lythargyritum, cum tinctura opii, under which they quickly diminiſhed and diſperſed.

Case II. " A man about 35 years of age was admitted into St. Bartholomew's hoſpital, under the care of Mr. Pott: he had been bled in the country, about a fortnight before his admiſſion; ſince that time he had been extremely ill, and was with difficulty conveyed to London. The ſtate in which he was admitted, I ſhall deſcribe: his whole arm was greatly ſwoln, the wound made by the lancet was not united, the parts immediately ſurrounding it did not ſeem to be affected by diſtinct inflammation, but partook of the general tumefaction. Two large abſceſſes had formed, one ſituated near the inner edge of the biceps muſcle, about the middle of the arm, and the other on the inſide of the fore-arm. The patient told us that he had been bled on account of a pain in his ſide; that the orifice, inſtead of healing, had feſtered; that he had for a time purſued his daily employment, notwithſtanding the pain which he ſuffered; that this, however, ſoon became too violent to be endured, and the ſwelling extended towards the armpit, where the glands became enlarged. Inflammation next attacked the fore-arm; and after ſuffering extreme pain and fever, theſe abſceſſes had formed, and ſince that time his illneſs and pain had in ſome degree abated. Mr. Pott opened both abſceſſes, and directed his whole arm to be covered with a poultice. The patient was kept in bed, and medicines likely to alleviate inflammation were preſcribed. In about four weeks the arm was reduced nearly to its natural dimenſions. The orifice through which he was bled had united, and the wounds by which the abſceſſes had been opened were nearly healed. The parts ſurrounding them, however, ſtill remained thickened, and alſo all the integuments on the inſide of the arm. In theſe thickened integuments, three chord-like ſubſtances, evidently abſorbents, were to be diſtinguiſhed; they extended from the punctured part to the ſuperior abſceſs; and again above this, two were continued even to the axilla. Two other indurated abſorbents alſo were extended from the punctured part to the inferior abſceſs. The punctured vein being attentively examined, was found to be a little thickened, both above and below the orifice; it had, however, no connection with theſe chord-like ſubſtances, they were ſuperficial, and their appearance, courſe, and every other circumſtance, clearly ſhewed them to be indurated abſorbents. The hardneſs of theſe veſſels and of the integuments had much diminiſhed, and the patient had regained the ſtrength of his arm, before he was diſcharged from the hoſpital.

CASE III. "A poor man was bled in one of the bleeding ſhops of this city. His operator dipped ſome rag in the blood which he had taken, applied it to the orifice, and bound it on the arm with a tape. The patient felt much pain in the wound, even from the time of the operation, and experienced much difficulty in moving his arm. As the rag ſtuck cloſely to the orifice, he was unwilling to remove it; however, on the third day the violence of the pain induced him to take it off: he then found the parts ſurrounding the puncture inflamed and hardened. The patient had alſo ſuffered much pain, which extended towards the axilla, and one of the glands there was ſwoln. He anointed the arm with ſome ointment, but the pain ſo increaſed that he could ſcarcely bear it to touch his ſide. The integuments about the middle of the arm were elevated by a tumor, which was painful when preſſed: the baſe of it was not circumſcribed, but was gradually loſt in the ſurrounding parts. In this ſituation he requeſted my advice. I gave him ſome mild ſalve to dreſs the wounded part; I directed him conſtantly to keep applied to the integuments, covering the inflamed lymphatics, ſome cloths wetted with the cold aqua aceti lythargyriti cum opio, to keep his arm completely ſupported by a ſling, and to take ſome gently purgative medicine.

"This he did; the inflammation gradually ſubſided, and the wound made by the lancet healed."

In order to obviate any ſuſpicion that, in the foregoing caſes, the lancet employed was *envenomed*, and that the *abſorption of virulent matter* cauſed the inflammation, Mr. Abernethy proceeds to make the following remarks:

"Phyſiology ſhews to us," ſays he, "that *the abſorbents poſſeſs much ſenſibility:* their rejection of one kind of air, which is not evidently acrid, and their ready abſorption of another, in my opinion, proves them to be endued with no ſlight degree of ſenſation. Practical obſervation further ſtrengthens this opinion: the celerity with which theſe veſſels inflame, when they have imbibed noxious matter, and the pain which is ſuffered in conſequence, ſufficiently prove this circumſtance. Their frequent inflammation in conſequence of diſturbance of the general conſtitution, may be however regarded as an additional argument. A common cold produces a painful tumefaction of their glands; and in ſome fevers theſe parts are particularly obnoxious to diſeaſe.

"There is another circumſtance which deſerves attention; when the abſorbents become inflamed, they quickly communicate this diſeaſe to the cellular ſubſtance by which they are ſurrounded. Moſt ſurgeons have remarked theſe veſſels, when indurated, to appear like ſmall chords, perhaps of one-eighth of an inch in diameter; this ſubſtance is ſurely not the ſlender ſides of the veſſel thus ſuddenly augmented in bulk, but an induration of the ſurrounding cellular ſubſtance to which the irritated veſſel has communicated inflammation. The formation of a common bubo is another inſtance of the power which theſe veſſels poſſeſs of involving the ſurrounding parts in their diſeaſe; at firſt one or two glands are found to be inflamed; but they ſoon become undiſtinguiſhable in the general inflammation of the ſurrounding ſubſtance. This inflammation either is diſperſed, or it terminates in ſuppuration: and on the ſubſidence of the general tumor the originally diſeaſed glands again become noticeable. Thoſe frequently enormous tumors which form by the ſide of the neck, further confirm the obſervation: enquire into the origin and progreſs of the diſeaſe, and it will be found that one or two glands were at firſt affected, and that the diſeaſe extended itſelf to the ſurrounding ſubſtance, of which the greateſt part of the ſwelling is compoſed. This remark muſt be taken with ſome limitation, for the glands of the neck do frequently enlarge to a conſiderable degree, without the ſurrounding cellular ſubſtance partaking of the diſeaſe; yet in ſuch caſes their growth is very gradual, and unaccompanied with active inflammation. Such are the reaſons which induce me to ſuppoſe theſe veſſels to be very ſenſible and irritable; and to poſſeſs a power of readily communicating diſeaſe to the cellular ſubſtance in which they lie."

Mr. Abernethy next endeavours to ſhew that their inflammation, in conſequence of local injury, is *deducible* from *two cauſes:* "one, the abſorption of acrid matter; and the other, the effect of irritation of the divided tube. Of the inflammation ariſing from the abſorption of morbiferous matter every one is appriſed, but that which is the effect of irritation has been leſs remarked.

"When virulent matter," ſays the author, "is taken up by the abſorbents, it is generally conveyed to the next abſorbent gland; where, its progreſs being retarded, its ſtimulating properties induce inflammation, and frequently no evident diſeaſe of the veſſel through which it has paſſed can be diſtinguiſhed. The abſorption of ſyphilitic and cancerous matter affords frequent proofs of this aſſertion. There are, indeed, ſome poiſons ſo acrid, that the veſſel which admits them inflames throughout its whole extent; yet ſtill the glands are principally affected. When inflammation of the abſorbents happens in conſequence of irritation, that part of the veſſel neareſt the irritating cauſe generally ſuffers moſt; whilſt the glands, being remotely ſituated, partake leſs of the inflammation. *The inflammation is alſo of a different kind*, and, I think, can be diſcriminated: when it ariſes from poiſon reſident in the part, the gland is firſt indurated, and a phlegmonoid inflammation follows; but if irritation be the cauſe of its enlargement, the tumefaction more ſpeedily takes place; the gland is more painful in its early ſtate, but has leſs tendency to ſuppurate; the enlargement more reſembles that of the lymphatic glands of the neck, which is the conſequence of taking cold.

"When the inflammation ariſes from *irritation* it will be expected, and I believe it will be found, that the continuity of the veſſel will be apparent: but it does not follow that the greateſt diſeaſe will be immediately adjoining that part which has ſuſtained the injury. The caſes which have been related ſhew that inflammatory tumors often form in the middle of the arm, and fore-arm; when the wound of the abſorbent is at the bend of the elbow. Were it neceſſary, I could relate ſeveral caſes where ſuch tumors formed from injuries done to the fingers, or in conſequence of fretting ulcers of the leg. When they ariſe from the latter cauſe it might be ſuppoſed that ſome acrid matter had been imbibed, yet I think in that caſe we ſhould find the glands the principal ſeat of the diſeaſe. It has been proved that the abſorbents frequently inflame far below the part where the veſſel has ſuſtained an injury, and where the inflammation could not be occaſioned by abſorption. Theſe obſervations I thought it right to inſert, to illuſtrate the caſes which have been related; and alſo to excite more general attention to the diſeaſes of theſe important veſſels."

3. *Inflammation of the vein.* After a conciſe account of Mr. Hunter's opinion, which we have already given, Mr. Abernethy ſays, "I have ſeen but three caſes where an inflammation of the vein ſucceeded to venæſection; they, however, confirm the foregoing obſervations. The vein did not in either caſe evidently ſuppurate. In the firſt, about three inches of the venal tube inflamed both above and below the orifice; it was accompanied with much tumor, redneſs, and pain of the covering integuments, and much fever; the pulſe was rapid, and the tongue furred. After the inflammation had terminated, and all tumor had ſubſided, the vein did not ſwell, when compreſſion was made above the diſeaſed part. The ſecond caſe was of a ſimilar nature, but leſs in degree. In the third caſe the inflammation was not continued in the courſe of the vein towards the heart, but extended as low as the wriſt. I have no doubt, but that adheſion of the ſides of the vein was the cauſe which prevented the extenſion of the diſeaſe equally in both directions. The nature of a diſeaſe being known, the treatment is commonly evident. The diminution of inflammation in a vein is to be attempted by the ſame general means as in other parts. As the membranous lining of the vein is continued to the heart, and as inflammation is very ſpeedily extended along ſuch ſurfaces, unleſs prevented by adheſion, the application of a compreſs at ſome diſtance from the punctured part, in order to unite the inflamed ſides of the vein, appears to be particularly judicious.

" I am induced to ſuppoſe a caſe may occur in which *the vein may ſuppurate*, and in which a total diviſion of the tube may be proper practice; not merely to obviate the extenſion of the local diſeaſe, but to prevent the mixture of collected pus with the circulating fluids."

4. *Inflammation of the faſcia of the fore-arm.* " As far as my obſervation hath extended," ſays Mr. Abernethy, " the next frequent ill conſequence which ſucceeds to venæſection, performed in the arm, is an inflammation of the *ſubjacent faſcia*. When this complaint occurs, it perhaps ariſes not merely from the contiguity of the faſcia to the punctured and irritated parts, but it is probable that it was wounded by the lancet in the operation." Sufficient information of the ſymptoms, and effects of this diſeaſe, are conveyed in the following caſes.

Case I. " A man, aged 40, was admitted into St. Bartholomew's hoſpital, under the care of Mr. Pott: he had much pain and difficulty of moving his arm, in conſequence of inflammation ſucceeding to phlebotomy. The wound inflicted in that operation was not healed; the ſurrounding integuments were not much inflamed, but he could neither extend his fore-arm nor his fingers without great pain. The integuments of the fore-arm were affected with a kind of eryſipelas; when ſlightly touched they were not very painful, but when more forcibly compreſſed, ſo as to affect the inferior parts, much pain was ſuffered. The patient complained of pain extending towards the axilla, and alſo towards the acromion; but no tumor of the arm, in either direction, was perceptible. A poultice was applied to the arm, opium was given at night, and aperient medicines were occaſionally preſcribed. The pain in the arm increaſed, and it was attended by much fever. After a week had elapſed, a ſmall and ſuperficial collection of matter took place a little below the internal condyle; this being opened, but little pus was diſcharged: and ſcarcely any decreaſe of tumor or pain followed. About ten days afterwards a fluctuation of matter was diſtinguiſhed below the external condyle; an inciſion was here alſo made, which penetrated the faſcia of the fore-arm. Much matter immediately guſhed from the wound, the ſwelling greatly ſubſided, and the future ſufferings of the patient were comparatively of little conſequence. This opening was, however, inadequate to the complete diſcharge of the matter; which had probably been originally formed beneath the faſcia, in the courſe of the ulna: its pointing at the upper part of the arm depended on the tenuity and comparative non-reſiſtance of the faſcia at that part. The collected pus deſcended to the lower part of the detached faſcia; a depending opening for its diſcharge became neceſſary, after which the patient recovered without any circumſtance being obſerved worthy relation. The caſe which I have juſt related, and that in which two large abſceſſes had formed, attended with indurated abſorbents, occurred nearly at the ſame time at the hoſpital, and they both fell under the care of Mr. Pott. In the lectures of that eminent ſurgeon, I had heard dangerous and fatal conſequences attributed to the injury of a nerve in venæſection, but I learned no other diſtinction of caſes. Theſe caſes firſt excited my attention to this ſubject, and, as far as I know, ſuch diſcrimination as that which I now offer to the public hath not been attempted."

The author here ſpeaks of another caſe of inflamed faſcia, in which no inflammation of the vein or abſorbents appeared. "The integuments were not much affected, but the patient complained that his arm felt as if bound or compreſſed, and that he ſuffered much pain if he attempted to extend it. The inflammation ſubſided without the formation of matter; and after much time had elapſed, the pliability of the arm was gradually regained."

In the ſecond volume of the Medical Communications, two caſes of inflammation of the *faſcia*, attended, however, with ſome peculiarity of ſymptoms, may be found.

"The *treatment* of an inflamed faſcia," ſays Mr. Abernethy, "the conſequence of venæſection, has in it no peculiarity. Doubtleſs thoſe general means which are reductive of inflammation ſhould be employed. Of local treatment, quietude of the limb, and a ſtate of relaxation of the inflamed part, will tend to leſſen diſeaſe; but as ſoon as ſome abatement of inflammation is procured, the extenſion of the fore-arm and fingers ought to be attempted, and daily performed, to obviate that contraction which might otherwiſe enſue."

5. *The ill conſequences ſucceeding to a wounded nerve* come next under conſideration. On that ſubject, after ſome preliminary remarks, the author proceeds as follows:

"I ſhall," ſays he, "arrange what I have to ſay on this ſubject in the following manner: 1ſt, I ſhall explain what nerves are expoſed to injury: 2dly, I ſhall inveſtigate what are the effects likely to be produced by ſuch an accident; and, 3dly, I ſhall enquire, what means are moſt likely to afford relief.

"*Firſt*, the two cutaneous nerves are thoſe which are expoſed to injury; I diſſected them, in ſeveral ſubjects, with attention; and found ſome irregularity in their diſtribution: moſt frequently all their branches paſs beneath the veins at the bend of the arm; but ſometimes, although the principal rami ſtill go beneath theſe veſſels, many ſmall filaments are detached before them, which it is impoſſible to avoid wounding in phlebotomy. As I believe many ſurgeons retain but an indiſtinct remembrance of theſe nerves, and as I have never ſeen them accurately depicted in any anatomical book, I thought I ſhould do an acceptable ſervice by giving an engraving of them. I therefore made two drawings of them; one exhibiting their moſt ſimple courſe, the other their moſt complicated diſtribution. Theſe, I conclude, are the only nerves liable to injury: it may be ſuſpected that the median nerve might occaſionally be wounded; but its ſituation, I think, makes this opinion improbable.

If, however, a doubt ſhould be entertained on this ſubject, an attention to ſymptoms will ſoon diſpel it; when a nerve is irritated at any part between its origin and termination, a ſenſation is felt as if ſome injury were done to the parts which it ſupplies. If, therefore, the cutaneous nerves were injured, the integuments of the fore-arm would ſeem to ſuffer pain; but if the median nerve was wounded, the thumb and two next fingers would be painfully affected.

By delineations annexed to his Eſſay, Mr. Abernethy ſhews, that if the patient be bled in the *vena mediana baſilica*, the branches of the *internal cutaneous nerve* are expoſed to injury: or if the *vena mediana cephalica* be opened, the branches of the *external cutaneous nerves* may be wounded.

"*Secondly*," ſays he, "I wiſh to enquire, what are the ills likely to ariſe from a wounded nerve. Whoever reflects on the wonderful minuteneſs of the nervous fibrils, and conſiders their perfect diſtinctneſs from each other, although connected by a common covering of cellular ſubſtance, will ſcarcely imagine a partial diviſion of a nervous fibril. If I ſought to expreſs myſelf ſtrictly on this ſubject, I ſhould ſpeak of a partial diviſion of a pacquet of nerves; but I ſhall uſe the commonly adopted language, and call thoſe chords nerves, which are really compoſed of multitudes of ſeparate nerves. I firſt beg leave to examine the opinion which has prevailed of a nerve being partially divided. Admitting that a nerve be partially divided, would it not, like a tendon, or any other ſubſtance, unite? I think there can be no doubt but that it would: I am induced to this opinion by conſidering that nerves of equal ſize with the cutaneous nerves of the arm, are diſtributed in conſiderable numbers throughout the body. In the many operations performed, and in the wounds daily occurring, I think it would be ſtrange if a partial diviſion of a nerve ſhould not happen; yet no peculiar ſymptoms are obſerved uſually to enſue. The pain which ſome people ſuffer from bleeding, in my opinion, indicates an injury done to a nerve. If the reader refers to the plate he will perceive that in ſome caſes it is impoſſible to avoid dividing branches of nerves in phlebotomy, as ſometimes they paſs before the vein. I believe theſe to be branches ſo frequently wounded, that I ſhould be ſurpriſed if they did not many times ſuffer a partial diviſion. Surely, however, a half-divided nerve would unite without cauſing a general derangement of the nervous ſyſtem. Yet it is poſſible that an inflammation of the nerve may accidentally enſue; which would be aggravated if it were kept tenſe, in conſequence of imperfect diviſion. In the caſes related by Mr. Pott and doctor Monro, I believe that ſome days elapſed after the receipt of the injury before any alarming derangement of the nervous ſyſtem enſued. Inflammation of the ſurrounding parts alſo appeared. Theſe obſervations make it to me evident that the diſeaſe conſiſts in inflammation of the injured nerve, in common with the other wounded parts; and this inflammation I can conceive to happen with or without a total diviſion of the nervous chord. I ſhould conſider a caſe of inflamed nerve as an object of great curioſity; every one, I think, will admit that it is likely to communicate dreadful irritation to the ſenſorium; and every one will perceive that a cure will probably ariſe from intercepting its communication with that important part.

"*Thirdly*, I proceed to enquire, what is the moſt probable method of relieving the effects ariſing from an inflamed nerve. The general opinion is, that the nerve is only partially divided, and that a total diviſion would free the patient from the continuance of his ſufferings. Mr. Pott ſuppoſed that the wounded nerve was ſituated at one or the other extremity of the wound which had been made in the vein; he, therefore, propoſed to divide it totally by enlarging a little the original orifice. It is, however, poſſible that the point of the lancet might injure a nerve lying beneath the vein. [This Mr. Abernethy illuſtrates by referring to the plate.] Mr. Bell directs an extenſive tranſverſe inciſion to be made through the original wound; but if the injured nerve be ſituated at the upper or lower extremity of the orifice, it will remain unaffected by this operation. Mr. Bell alſo adviſes the inciſion to be continued to the bone; but this appears to me dangerous and unneceſſary.

" If the injured nerve be inflamed, I think it doubtful whether even a total diviſion of it at the inflamed part would effectually relieve the general nervous irritation which the diſeaſe has occaſioned. To intercept the communication of the inflamed nerve with the ſenſorium does, however, promiſe perfect relief. This intention can only be accompliſhed by making a tranſverſe inciſion above the orifice in the vein. The inciſion need not be very extenſive, for the injured nerve muſt lie within the limits of the original orifice, and it need only deſcend as low as the faſcia of the fore-arm; for all the filaments of the cutaneous nerves lie above this faſcia. The vein which had been opened, and ſome filaments of the cutaneous nerves, are all the parts of conſequence which will be divided in this operation. The proximity of the diviſion of the nerve to the vein muſt be regulated by the ſuppoſed extent of the diſeaſe; however, as the extent of the inflammation of the nerve is uncertain, I ſubmit it to the conſideration of ſurgeons, whether it may not be adviſable, in ſome caſes, to divide either of the cutaneous nerves ſtill more remotely from the injured nerve."

Mr. Abernethy concludes by remarking that there is little difficulty in detecting the trunk of theſe nerves in the dead ſubject; and he therefore ſuppoſes but little would occur in the living ſtate, ſince the compreſſion of the tourniquet would prevent any inconvenience which hæmorrhage might cauſe to the operator.

We now return from this digreſſion to the general ſubject of the preſent ſection.

There is only one vein of *the neck*, viz. the poſterior external jugular, which can be eaſily brought ſo much into view as to be with propriety opened; and even this lies deeply covered with parts, not only with the ſkin and cellular ſubſtance, but with the fibres of the platiſmamyoides muſcle; ſo that a conſiderable degree of preſſure becomes neceſſary in order to raiſe it to any height. With a view to produce this, the operator's thumb is commonly adviſed to be placed upon the vein, ſo as to compreſs it effectually about an inch or an inch and a half below where the opening is to be made. This, however, ſeldom proves ſufficient for the purpoſe, as the blood, on being ſtopped in its progreſs through this branch, eaſily finds a paſſage to the other veins; ſo that unleſs the principal vein on the other ſide of the neck is alſo compreſſed, the vein to be opened can never be fully diſtended. In order to effect this, a firm compreſs of linen ſhould be applied on the largeſt vein on the oppoſite ſide of the neck; and an ordinary garter, or any other proper ligature, being laid directly over it, ſhould be tied with a firm knot below the oppoſite arm-pit; taking care to make ſuch a degree of preſſure as to put an entire ſtop to the circulation in the vein, which in this way may be eaſily effected without producing any obſtruction to the patient's breathing.

This being done, and the patient's head properly ſupported, the operator, with the thumb of his left hand, is now to make a ſufficient preſſure upon the vein to be opened; and with the lancet in his right hand is to penetrate at once into the vein; and before withdrawing the inſtrument, an orifice ſhould be made large enough for the intended evacuation. It may be proper to obſerve, that a more extenſive opening ought always to be made here than is neceſſary in the arm, otherwiſe the quantity of blood is generally procured with difficulty: and beſides there is not the ſame neceſſity for caution on this point here that there is in the arm; for it ſeldom or never happens that any difficulty occurs in this ſituation, in putting a ſtop to the blood after the preſſure is removed from the veins; all that is commonly neceſſary for this purpoſe being a ſlip of adheſive plaſter, without any bandage whatever.

In order to bring the vein more clearly into view, ſo as afterwards to be able to open it with more exactneſs, it has been recommended that the ſkin, cellular ſubſtance, and muſcular fibres, covering the vein, ſhould be previouſly divided with a ſcalpel before attempting to puſh the lancet into it. There is not, however, any neceſſity for this precaution, as it rarely happens that any difficulty is experienced in procuring a free diſcharge of blood by opening the vein and teguments at once in the manner directed. And it is here, as in every inſtance where it is neceſſary to take blood by a lancet, if it is not done at once, the patient is much diſappointed, and is ſure to attribute the failure entirely to a fault in the operator.

When blood is to be diſcharged from the veins of the *ancle* or *feet*, the ligature being applied a little above the ancle-joint, all the branches of the vena ſaphena, both on the inſide and outſide of the foot, come at once into view; and as this vein lies every-where very ſuperficial, being in general covered with ſkin only, wherever a proper vein appears conſpicuouſly it may with ſafety be opened.

With a view to encourage the diſcharge of blood, it has been a conſtant practice in blood-letting, in theſe veins, to dip the feet into warm water immediately on the orifice being made. But this is a very inaccurate method of proceeding, as the quantity of blood taken in this manner can never be aſcertained with preciſion; for the blood being all mixed with the water, the operator can never be in any degree certain as to this point: and beſides, there does not appear to be any neceſſity for this aſſiſtance; for when the compreſſion of the ſuperior part of the veins is made effectual, and the orifice is of a proper ſize, there is ſeldom more difficulty in obtaining a full diſcharge of blood from the veins of theſe parts than from any other veins of the body.

On removing the ligature, the diſcharge is generally ſtopped at once; ſo that a piece of adheſive plaſter applied over the orifice, anſwers all the purpoſe of a bandage. The arm, neck, and ancles, are parts from whence blood is uſually taken by veneſection; but on ſome occaſions, where the contiguous parts have been particularly affected, it has been thought adviſable to perform venæſection in other places.

When veneſection is to be performed in the veins called *ranulæ*, under the tongue, the apex of the tongue is to be elevated, and the vein on each ſide opened, becauſe the opening of one will hardly ever diſcharge blood enough. After a ſufficient quantity has been diſcharged, ſome cold aſtringent fluid taken into the mouth will generally ſtop the hemorrhagy.

The *vena dorſalis penis*, which runs along the back or upper ſide of this member, being generally pretty much diſtended, and conſpicuous in an inflammation of this part, may be opened about the middle or back-part of the penis; and a ſufficient quantity of blood be diſcharged, proportionable to the urgency of the ſymptoms. This being done, apply a compreſs and bandage proper for the penis. The arteries and nerves which lie on each ſide of the vein are to be avoided: nor ought the bandage to be too tight, otherwiſe the inflammation and other ſymptoms may turn out worſe than before.

When it is found neceſſary to diſcharge blood in this manner from the penis, the veins can be eaſily brought into view, by producing an accumulation of their contents in the ſame manner as in other parts of the body, through the intervention of a ligature: but in the tongue, in the hæmorrhoidal veins about the anus, and other parts where compreſſion cannot be applied, all that the ſurgeon can do, is to make an orifice of a proper ſize in that part of the vein which ſhews itſelf moſt evidently; and if a ſufficient diſcharge of blood is not thus produced, as there is no other method of effecting it, immerſing the parts in warm water may, in ſuch circumſtances, be a very neceſſary meaſure.

There are ſeveral ways of performing the operation of blood-letting in the *eyes*. We ſhall here only relate the chief: Firſt, the patient is to be ſeated conveniently on the bed-ſide or on a chair, with his head held in a proper poſture by an aſſiſtant; which done, the ſurgeon makes a tranſverſe inciſion with a lancet upon the turgid ſmall veſſels in the corners of the eye, ſo as to open them or cut them quite acroſs. Some uſe a ſmall pair of ſciſſars, inſtead of a lancet, to divide the veſſels; but in uſing either of them, the eye-lids muſt be ſeparated from each other by the fingers of one hand, while the veſſels are cut by inſtruments held in the other. Some, again, elevate the ſmall turgid veſſels with a crooked needle before they divide them, the eye-lids being in the mean time held aſunder by an aſſiſtant. The ſmall veſſels being thus opened or divided, their diſcharge of blood ſhould be promoted by fomentations of warm water frequently applied to the eye by means of a ſponge or ſoft linen rags.

Among other methods that have been propoſed for ſcarifying the blood-veſſels of the eye, the beards of rough barley were at one period much extolled, and are ſtill employed by ſome individuals. By drawing them over the ſurface of the eye, in a direction contrary to the ſharp ſpiculæ with which they are furniſhed, a conſiderable diſcharge of blood is thereby produced: but the pain attending this operation is exquiſite; and as it does not poſſeſs any ſuperior advantage to the method with the lancet, it is now falling into general diſuſe.

SECT. III. *Of* ARTERIOTOMY.

Whatever particular advantages may in theory have been expected from arteriotomy, and however ſome of its ſupporters may have recommended it, not only as being in many inſtances preferable to veneſection, but as an operation perfectly ſafe even in veſſels of conſiderable ſize, yet the moſt ſtrenuous friends to the practice have ſhrunk from any real attempt of this kind on the larger arteries. Inſtances have no doubt occurred of large arteries having been opened without any danger enſuing; but theſe are ſo exceedingly rare, that no practitioner of experience will, from that conſideration, be induced coolly to proceed to open any artery of importance. The ſmaller branches of arteries may indeed be opened with great ſafety, when they are not deeply covered, and eſpecially when they lie contiguous to bones; but in any of the larger arteries, the attempt muſt be always attended with ſo much hazard, and the advantages to be expected from it, in preference to venæſection, are apparently ſo trifling, as muſt in all probability prevent it from ever being carried into execution.

There are very few arteries, therefore, which with any propriety can be opened: the different branches of the temporal are the only arteries indeed from whence blood, in ordinary practice, is ever taken; for although the opening of ſome other branches of arteries has by ſome been propoſed, yet they are ſituated in ſuch a manner that they either cannot be readily come at, or being in the neighbourhood of large nerves, the opening of them might be attended with bad conſequences. In performing this operation on any of the temporal branches, if the artery lies ſuperficial, it may be done with one puſh of the lancet, in the ſame manner as was directed for venæſection; but when the artery lies deeply covered with cellular ſubſtance it is always neceſſary to lay it fairly open to view, before making the orifice with the lancet: for in all the ſmaller arteries, when they are cut entirely acroſs, there is little chance of being able to procure any conſiderable quantity of blood from them; as, when divided in this manner, they are ſure to retract conſiderably within the ſurrounding parts, which commonly puts a ſtop to all farther evacuation.

Some degree of nicety is alſo neceſſary in making the opening into the artery of a proper oblique direction, neither quite acroſs nor directly longitudinal; for a longitudinal opening never bleeds ſo freely, either in an artery or in a vein, as when its direction is ſomewhat oblique.

If the opening has been properly made, and if the artery is of any tolerable ſize, it will at once diſcharge very freely without any compreſſion; but when the evacuation does not go on ſo well as could be wiſhed, the diſcharge may be always aſſiſted by compreſſing the artery immediately above the orifice, between it and the correſponding veins. The quantity of blood being thus diſcharged, it will commonly happen, that a very ſlight compreſſion on theſe ſmaller arteries will ſuffice for putting a ſtop to the evacuation; and whatever preſſure is found neceſſary, may be here applied in the ſame manner as was directed in venæſection.

It happens, however, in ſome inſtances, that this does not ſucceed, the orifice continuing to burſt out from time to time, ſo as to be productive of much diſtreſs and inconvenience.

In this ſituation there are three different methods by which we may with tolerable certainty put a ſtop to the farther diſcharge of blood. 1ſt. If the artery is ſmall, as all the branches of the temporal arteries commonly are, the cutting it entirely acroſs, exactly at the orifice made with the lancet, by allowing it to retract within the ſurrounding parts, generally puts an immediate ſtop to the diſcharge. 2d. When that is not conſented to, we have it always in our power to ſecure the bleeding veſſel with a ligature, as we would do an artery accidentally divided in any part of the body. And, laſtly, if neither of theſe methods is agreed to by the patient, we can, by means of a conſtant regular preſſure, obliterate the cavity of the artery at the place where the operation has been performed, by producing the accretion of its ſides. Different bandages have been contrived for compreſſing the temporal artery; but none of them anſwer the purpoſe ſo eaſily and ſo effectually as the one figured in Plate I. fig. 7. This method is more tedious; but to timid patients it generally proves more acceptable than either of the other two.

SECT. IV. *Of* TOPICAL BLEEDING.

When, either from the ſeverity of a local fixed pain, or from any other cauſe, it is wiſhed to evacuate blood directly from the ſmall veſſels of the part affected, inſtead of opening any of the larger arteries or veins, the following are the different modes propoſed for effecting it, viz. by means of leeches; by ſlight ſcarifications with the ſhoulder or edge of a lancet; and, laſtly, by means of a well-known inſtrument termed a *ſcarificator*; in which ſixteen or twenty lancets are commonly placed, in ſuch a manner, that, when the inſtrument is applied to the part affected, the whole number of lancets contained in it are, by means of a ſtrong ſpring, puſhed ſuddenly into it, to the depth at which the inſtrument has been previouſly regulated. This being done, as the ſmaller blood-veſſels only by this operation are ever intended to be cut, and as theſe do not commonly diſcharge freely, ſome means or other become neceſſary for promoting the evacuation.

Various methods have been propoſed for this purpoſe. *Glaſſes* fitted to the form of the affected parts, with a ſmall hole in the bottom of each, were long ago contrived; and theſe being placed upon the ſcarified parts, a degree of ſuction was produced by a perſon's mouth ſufficient for nearly exhauſting the air contained in the glaſs: and this accordingly was a ſure enough method of increaſing the evacuation of blood to a certain extent. But as this was attended with a good deal of trouble, and beſides did not on every occaſion prove altogether effectual, an exhauſting ſyringe was at laſt adapted to the glaſs: which did indeed anſwer as a very certain method of extracting the air contained in it; but the application of this inſtrument for any length of time is very troubleſome, and it is difficult to preſerve the ſyringe always air-tight.

The application of heat to the *cupping-glaſſes*, has been found to rarefy the air contained in them to a degree ſufficient for producing a very conſiderable ſuction. And as the inſtrument in this ſimple form anſwers the purpoſe in view with very little trouble to the operator, and as it is at all times eaſily obtained, the uſe of the ſyringe has therefore been laid aſide.

There are different methods adopted for thus applying heat to the cavity of the glaſs. By ſupporting the mouth of it for a few ſeconds above the flame of a taper, the air may be ſufficiently rarefied; but if the flame is not kept exactly in the middle, but is allowed to touch either the ſides or bottom of the glaſs, it is very apt to make it crack. A more certain, as well as an eaſier, method of applying the heat, is to dip a piece of ſoft bibulous paper in ſpirit of wine; and having ſet it on fire, to put it into the bottom of the glaſs, and, on its being nearly extinguiſhed, to apply the mouth of the inſtrument directly upon the ſcarified part. This degree of heat, which may be always regulated by the ſize of the piece of paper, and which it is evident ought to be always in proportion to the ſize of the glaſs, if long enough applied, proves always ſufficient for rarefying the air very effectually, and at the ſame time, if done with any manner of caution, never injures the glaſs in the leaſt.

The glaſs having been thus applied, if the ſcarifications have been properly made, they inſtantly begin to diſcharge freely: and ſo ſoon as the inſtrument is nearly full of blood, it ſhould be taken away; which may be always eaſily done by raiſing one ſide of it, ſo as to give acceſs to the external air. When more blood is wiſhed to be taken, the parts ſhould be bathed with warm water; and being made perfectly dry, another glaſs, exactly the ſize of the former, ſhould be inſtantly applied in the very ſame manner: and thus, if the ſcarificator has been made to puſh to a ſufficient depth, ſo as to have cut all the cutaneous veſſels of the part, almoſt any neceſſary quantity of blood may be obtained. It ſometimes happens, however, that the full quantity intended to be diſcharged cannot be got at one place. In ſuch a caſe, the ſcarificator muſt be again applied on a part as contiguous to the other as poſſible; and this being done, the application of the glaſſes muſt alſo be renewed as before.

When it is wiſhed to diſcharge the quantity of blood as quickly as poſſible, two or more glaſſes may be applied at once on contiguous parts previouſly ſcarified; and, on ſome occaſions, the quantity of blood is more quickly obtained by the cupping-glaſſes being applied for a few ſeconds, upon the parts to be afterwards ſcarified. The ſuction produced by the glaſſes may poſſibly have ſome influence in bringing the more deep-ſeated veſſels into nearer contact with the ſkin, ſo that more of them will be cut by the ſcarificator.

A ſufficient quantity of blood being procured, the wounds made by the different lancets ſhould be all perfectly cleared of blood; and a bit of ſoft linen or charpie, dipped in a little milk or cream, applied over the whole, is the only dreſſing that is neceſſary. When dry linen is applied, it not only creates more uneaſineſs to the patient, but renders the wounds more apt to feſter than when it has been previouſly wetted in the manner directed.

Dry cupping conſiſts in the application of the cupping-glaſſes directly to the parts affected, without the uſe of the ſcarificator. By this means a tumor is produced upon the part; and where any advantage is to be expected from a determination of blood to a particular ſpot, it may probably be more eaſily accompliſhed by this means than by any other.

When the part from which it is intended to produce a local evacuation of this kind is ſo ſituated, that a ſcarificator and cupping-glaſſes can be applied, this method is greatly preferable to every other; but in inflammatory affections of the eye, of the noſe, and of other parts of the face, &c. the ſcarificator cannot be properly applied directly to the parts affected. In ſuch inſtances, *leeches* are commonly had recourſe to, as they can be placed upon almoſt any ſpot from whence we would wiſh to diſcharge blood.

In the application of theſe animals, the moſt effectual method of making them fix upon a particular ſpot, is to confine them to the part by means of a ſmall wine-glaſs. Allowing them to creep upon a dry cloth, or upon a dry board, for a few minutes before application, makes them fix more readily; and moiſtening and cooling the parts on which they are intended to fix, either with milk, cream, or blood, tends alſo to make them adhere much more ſpeedily than they otherwiſe would do. So ſoon as the leeches have ſeparated, the ordinary method of promoting the diſcharge of blood, is to cover the part with linen cloths wet in warm water. In ſome ſituations, this may probably be as effectual a method as any other; but wherever the cupping-glaſſes can be applied over the wounds, they anſwer the purpoſe much more effectually.

CHAP. IX. OF ISSUES.

ISSUES are a kind of artificial ulcers formed in different parts of the body with a view to procure a diſcharge of purulent matter, which is frequently of advantage in different diſorders.

Practitioners were formerly of opinion that *iſſues* ſerved as drains to carry off the noxious humours from the blood, and therefore they placed them as near the affected part as poſſible. But as it is now known that they prove uſeful merely by the quantity of matter which they produce, they are generally placed where they will occaſion the leaſt inconvenience. The moſt proper parts for them are, the nape of the neck; the middle, outer, and fore part of the humerus; the hollow above the inner ſide of the knee; or either ſide of the ſpine of the back; or between two of the ribs; or wherever there is a ſufficiency of cellular ſubſtance for the protection of the parts beneath: they ought never to be placed over the belly of a muſcle; nor over a tendon, or thinly covered bone; nor near any large blood-veſſel.

The iſſues commonly uſed are, the bliſter-iſſue, the pea-iſſue, and the ſeton or cord.

When a *bliſter-iſſue* is to be uſed, after the bliſter is removed, a diſcharge of matter may be kept up by dreſſing the part daily with an ointment mixed with the powder of cantharides. If the diſcharge be too little, more of the powder may be uſed; if too great, or if the part be much inflamed, the iſſue ointment may be laid aſide, and the part dreſſed with baſilicon, or with common cerate, till the diſcharge be diminiſhed and the inflammation abated. It is moſt proper ſometimes to uſe the iſſue ointment and a mild one alternately.

A *pea-iſſue* is formed either by making an inciſion with a lancet, or by cauſtic, large enough to admit one or more peas; though ſometimes, inſtead of peas, kidney-beans, Gentian root, or orange-peas, are uſed. When the opening is made by an inciſion, the ſkin ſhould be pinched up and cut through, of a ſize ſufficient to receive the ſubſtance to be put into it. But when it is to be done by cauſtic, the common cauſtic, or lime and kali of the ſhops, anſwers beſt: it ought to be reduced to a paſte with a little water or ſoft ſoap, to prevent it from ſpreading; an adheſive plaſter, with a ſmall hole cut in the centre of it, ſhould be previouſly placed, and the cauſtic paſte ſpread upon the hole in the centre. Over the whole, an adheſive plaſter ſhould be placed to prevent any cauſtic from eſcaping. In ten or twelve hours the whole may be removed, and in three or four days the eſchar will ſeparate, when the opening may be filled with peas, or any of the other ſubſtances already mentioned.

The *ſeton* is uſed where a large quantity of matter is wanted, and eſpecially where it is wiſhed for from deep-ſeated parts. It is frequently uſed in the back of the neck for diſeaſes of the head or eyes, or between two of the ribs in affections of the breaſt.

When the *cord*, which is to be made of threads of cotton or ſilk, is to be introduced, the parts at which it is to enter and paſs out ſhould be previouſly marked with ink, and a ſmall part of the cord being beſmeared with ſome mild ointment, and paſſed through the eye of the ſeton-needle, Plate I. fig. 8. the part is to be ſupported by an aſſiſtant, and the needle paſſed fairly through, leaving a few inches of the cord hanging out. The needle is now to be removed and the part dreſſed. By this method matter is produced in quantity proportioned to the degree of irritation applied: and this can be increaſed or diminiſhed by covering the cord daily, before it is drawn, with an irritating or mild ointment.

CHAP. X. OF SUTURES AND LIGATURES OF ARTERIES.

SECT. I. *Of* SUTURES.

THE intention of *ſutures* is to unite parts which have been divided, and where the retraction of the lips of the wound has been conſiderable. The ſutures in ordinary uſe at preſent, among ſurgeons, are the interrupted, the quilled, and the twiſted. Beſides theſe ſutures, adheſive plaſters are uſed for uniting the lips of wounds, which have been termed the *falſe* or *dry* ſuture, in oppoſition to the others which have obtained the name of *true* or *moiſt*. The true ſuture is uſed in caſes of deep wounds, while the falſe is employed in thoſe of a ſuperficial nature.

The interrupted ſuture is made as follows. The wound being emptied of the grumous blood, and the aſſiſtant taking care that the lips of it lie quite even, the ſurgeon is carefully to carry the needles from the bottom outwards; uſing the caution of making them come out far enough from the edge of the wound, which will not only facilitate the paſſing of the ligature, but will alſo prevent it from cutting through the ſkin and fleſh; as many more ſtitches as may be required will be only repetitions of the ſame proceſs. The threads being all paſſed, let thoſe be firſt tied which are in the middle of the wound: though, if the lips are held carefully together all the while, as they ſhould be, it will be of no great conſequence which is done firſt. The moſt uſeful kind of knot is a ſingle one firſt, and then a ſlip-knot, which may be looſened upon any conſiderable inflammation taking place. If a violent inflammation ſhould ſucceed, looſening the ligature only will not ſuffice; it muſt be cut through and drawn away, and the wound be treated afterwards without any ſuture. When the wound is ſmall, the leſs it is diſturbed by dreſſing the better; but in large ones, there will ſometimes be a conſiderable diſcharge; and if the threads be not cautiouſly carried through the bottom of it, abſceſſes will frequently enſue from the matter being pent up underneath, and not finding iſſue. If no accident happen, after the lips are firmly agglutinated, the ligatures are to be removed, and the orifices which they leave dreſſed.

It will readily be underſtood, that the ſtrength of the ligature and ſize of the needle ought always to be proportionable to the depth of the ſore and retraction of the parts. The crooked needles uſed in ſuch caſes are known to every one.

It muſt likewiſe be remembered, that during the cure the ſuture muſt be always aſſiſted by the application of bandage, if poſſible, which is frequently of the greateſt importance; and that ſort of bandage with two heads, and a ſlit in the middle, which is by much the beſt, will in moſt caſes be found practicable.

In deep wounds, attended with much retraction, it is always a neceſſary precaution to aſſiſt the operation of the ligatures by means of bandages, ſo applied as to afford as much ſupport as poſſible to the divided parts: but even with every aſſiſtance of this nature, it now and then happens, that the divided parts cannot be kept together, retraction occurs to a greater or leſſer degree, and the ligatures of courſe cut aſunder the ſoft parts they were at firſt made to retain.

With a view to prevent this receding of the teguments and other parts, it was long ago propoſed to add to the interrupted ſuture what was ſuppoſed would afford an additional ſupport, viz. quills, or pieces of plaſter rolled up into the form of quills; one of which being placed on each ſide of the wound, the double of the ligature is made to include the one, and the knot to preſs directly upon the other, inſtead of being made immediately on the edges of the ſore, as was directed for interrupted ſutures.

It is at once evident, however, that the ligatures muſt here make the ſame degree of preſſure on the parts through which they paſs as they do in the interrupted ſuture; and this being the caſe, it is equally obvious, that the interpoſition of theſe ſubſtances cannot be of any uſe. This ſuture is accordingly now very rarely practiſed by ſurgeons.

By the term *twiſted ſuture*, is meant that ſpecies of ligature by which parts, either naturally or artificially ſeparated, are united together by means of ſtrong threads properly twiſted round pins or needles puſhed through the edges of the divided parts.

The ſuture is commonly employed for the purpoſe of uniting the parts in caſes of *hare-lip;* and this indeed is almoſt the only uſe to which it has been hitherto applied: but it may with great advantage be put in practice in a variety of other caſes, particularly in all artificial or accidental diviſions either of the lips or cheeks; and in every wound in other parts that does not run deep, and in which ſutures are neceſſary, this ſuture is preferable to the interrupted or any other. The pins made uſe of for twiſting the threads upon ought to be made of a flat form, ſo as not to cut the parts through which they paſs ſo readily as the ligatures employed in the interrupted ſuture. And thus one great objection to the latter is very effectually obviated: for every practitioner muſt be ſenſible of this being the moſt faulty part of the interrupted ſuture, that when muſcular parts are divided ſo as to produce much retraction, the ligatures employed for retaining them almoſt conſtantly cut them through before a reunion is accompliſhed; whereas the flatneſs of the pins uſed in the twiſted ſuture, and upon which the whole preſſure produced by the ligatures is made to reſt, proves in general a very effectual preventive againſt all ſuch occurrences.

The pins uſed in this operation are repreſented in Plate I. fig. 9. They are commonly made of gold or ſilver; and in order to make them paſs with greater eaſe, ſteel points are added to them. They are ſometimes uſed, however, of gold or ſilver alone.

The *manner of performing this operation* is as follows. The divided parts intended to be reunited, muſt, by the hands of an aſſiſtant, be brought nearly into contact; leaving juſt as much ſpace between the edges of the ſore as to allow the ſurgeon to ſee that the pins are carried to a proper depth. This being done, one of the pins muſt be introduced through both ſides of the wound, by entering it on one ſide externally, puſhing it forwards and inwards to within a little of the bottom of the wound, and afterwards carrying it outwardly through the oppoſite ſide, to the ſame diſtance from the edge of the ſore that it was made to enter at on the other.

The diſtance at which the needle ought to enter from the edge of the ſore muſt be determined by the depth of the wound, and by the degree of retraction produced in the divided parts. In general, however, it is a proper regulation, in deep wounds, to carry the pins nearly to the ſame diſtance from the ſide of the ſore as they are made to penetrate in depth: and whatever the deepneſs of the wound may be, the pins ought to paſs within a very little of its bottom: otherwiſe the parts which lie deep, will run a riſk of not being united; a circumſtance which muſt always give riſe to troubleſome collections of matter.

The firſt pin being paſſed in this manner very near to one end of the ſore, and the parts being ſtill ſupported by an aſſiſtant, the ſurgeon, by means of a firm waxed ligature, paſſed three or four times round and acroſs the pin, ſo as nearly to deſcribe the figure of 8, is to draw the parts through which it has paſſed into immediate and cloſe contact: and the thread being now ſecured with a looſe knot, another pin muſt be introduced in the ſame manner at a proper diſtance from the former; and the thread with which the other was fixed being looſed, and in the ſame manner carried round this pin, others muſt be introduced at proper diſtances along the whole courſe of the wound; and the ſame ligature ought to be of a ſufficient length for ſecuring the whole.

The *number of pins* to be uſed muſt be determined entirely by the extent of the wound. Whenever this ſuture is practiſed, a pin ought to be introduced very near each end of the wound, otherwiſe the extremities of the ſore are apt to ſeparate ſo as not to be afterwards eaſily reunited. In large wounds, if the pins are introduced at the diſtance of three quarters of an inch from one another, it will in general be found ſufficient; but in cuts of ſmaller extent a greater number of pins becomes neceſſary in proportion to the dimenſions of the ſores.

Thus in a wound of an inch and a half in length, three pins are abſolutely requiſite; one near to each end, and another in the middle of the ſore: whereas five pins will always be found fully ſufficient for a wound of three inches and a half in extent, allowing one to be within a quarter of an inch of each extremity of the wound, and the others to be placed along the courſe of the ſore at the diſtance of three quarters of an inch from one another.

The pins being all introduced and ſecured in the manner directed, nothing remains to be done, but to apply a piece of lint wet with mucilage all along the courſe of the wound, with a view to exclude, as effectually as poſſible, every acceſs to the external air.

When the pins remain long, they generally do harm, by the unneceſſary irritation and conſequent retraction of parts with which they are always attended; and if they are not continued for a ſufficient length of time, that degree of adheſion is not produced between the divided parts which is neceſſary for their future retention; ſo that the effect of the operation comes to be in a great meaſure, if not entirely, loſt.

In wounds of no great depth, for inſtance of three quarters of an inch or ſo, a ſufficient degree of adheſion always takes place in the ſpace of five days: and ſix, or at moſt ſeven days, will generally be found ſufficient for wounds of the greateſt depth. But with reſpect to this circumſtance, it muſt always be underſtood, that the patient's ſtate of health muſt have a conſiderable influence on the time neceſſary for producing adheſion between divided parts.

When the pins are withdrawn, the uniting bandage may be applied with great advantage; but as ſlips of leather ſpread with ordinary glue, when applied to each ſide of the cicatrix, may, by means of ligatures properly connected with them, be made to anſwer the purpoſe more effectually, this mode of ſupporting the parts ought of courſe to be preferred.

SECT. II. *Of the* LIGATURE *of* ARTERIES.

When a ſurgeon is called immediately to a wound of any great artery of a limb, he ſhould clap the point of his finger upon the wounded artery, or make his aſſiſtant hold it; cut the wound ſo far open as to ſee the artery fairly; draw it out if it be cut acroſs, and have ſhrunk among the fleſh; or tie it like the artery of the arm in aneuriſm by paſſing ligatures under it. When, however, the wound happens in ſuch ſituations that we cannot command the blood, it is better to cloſe the lips of the wound, and try to make them adhere by means of a very ſteady compreſs and bandage. Thus an aneuriſm will form; the operation for the cure of which ſhall be preſently deſcribed.

When accidents of this nature occur in any of the extremities, and where preſſure can be made with eaſe on the ſuperior part of the artery, we are poſſeſſed of an inſtrument which never fails to put a ſtop to all further loſs of blood: we mean the tourniquet. See Plate I. fig. 10.

The *tourniquet* has undergone many improvements; but the one here repreſented is conſidered as the beſt. By means of it the blood in any limb is very eaſily and effectually commanded; and as it graſps the whole member equally, all the collateral branches, as well as the principal arteries, are equally compreſſed by it. It has this material advantage too over every other inſtrument of this kind, that when properly applied a ſingle turn, or even half a turn, of the ſcrew, is ſufficient for producing either a flow of blood, or for putting a total ſtop to it.

The *manner of* uſing it is as follows. Let a cuſhion of three inches in length by one inch and half in diameter be prepared of a linen roller, tolerably firm, but not ſo hard as to render preſſure produced by it very painful. This being placed upon the courſe of the principal artery of the limb, is to be firmly ſecured in that ſituation by one or two turns of a circular roller, of the ſame breadth with the cuſhion itſelf.

The inſtrument, with the ſtrap connected with it, being now placed upon the limb, with the handle of the ſcrew on the oppoſite ſide of the member to the cuſhion upon the artery, the ſtrap is to be carried round the limb directly over the cuſhion, and to be firmly connected on the other ſide of the buckle. In thus connecting the ſtrap and buckle together, particular attention is neceſſary in doing it with great firmneſs, ſo as that the ſcrew may afterwards operate with as much advantage as poſſible in producing a ſufficient degree of preſſure. When proper attention is paid to this circumſtance, a ſingle turn of the ſcrew proves ſufficient for putting an entire ſtop to the circulation of blood in the limb: but when the ſtrap has not originally been made very tight, ſeveral turns of the ſcrew become neceſſary; an occurrence which may be always very eaſily prevented, and which, when not attended to, frequently proves very embarraſſing in the courſe of an operation.

Various methods have been invented for ſecuring arteries by means of ligatures. The practice till lately in ordinary uſe was, by means of a curved needle, to paſs a ligature of ſufficient ſtrength round the mouth of the bleeding veſſel, including a quarter of an inch all round the ſurrounding parts, and afterwards to form a knot of a proper tightneſs upon the veſſel and other parts comprehended in the nooſe. But this method was found to give ſo much pain, and in ſome caſes to be attended with ſuch violent convulſions, not only in the part chiefly affected, but of the whole body, that the beſt practitioners have thought proper to reject it, and to tie up the blood-veſſels by themſelves: for it is now well known that even very ſmall arteries are poſſeſſed of much firmneſs; and that even in the largeſt arteries a ſlight degree of compreſſion is ſufficient not only for reſtraining hæmorrhagy, but for ſecuring the ligature on the very ſpot to which it is firſt applied.

In order to detect the arteries to be tied, the tourniquet, with which they are ſecured, muſt be ſlackened a little by a turn or two of the ſcrew; and the moment the largeſt artery of the ſore is diſcovered, the ſurgeon fixes his eye upon it, and immediately reſtrains the blood again by means of the tourniquet. An aſſiſtant now forms a nooſe on the ligature to be made uſe of; and this nooſe being put over the point of the tenaculum, Plate I. fig. 11. the operator puſhes the ſharp point of the inſtrument through the ſides of the veſſel, and at the ſame time pulls ſo much of it out, over the ſurface of the ſurrounding parts, as he thinks is ſufficient to be included in the knot which the aſſiſtant is now to make upon the artery. In forming this ligature a ſingle knot moderately drawn, and over it another ſingle knot, is perfectly ſufficient.

When from the deepneſs of a wound, or from any other cauſe, ſome particular artery cannot be properly ſecured by the tenaculum; in this caſe there is a neceſſity of employing the crooked needle, and the following is the method of uſing it.

A needle of the common bent ſhape, armed with a ligature of a ſize proportioned to itſelf and to the veſſel to be taken up, is to be introduced at the diſtance of a ſixth or eighth part of an inch from the artery, and puſhed to a depth ſufficient for retaining it, at the ſame time that it is carried fully one half round the blood-veſſel. It muſt now be drawn out; and being again puſhed forward till it has completely encircled the mouth of the artery, it is then to be pulled out, and a knot to be tied of a ſufficient firmneſs, as already directed when the tenaculum is uſed.

CHAP. XI. OF ANEURISMS.

THE term *aneuriſm* was originally meant to ſignify a tumor formed by the dilatation of the coats of an artery; but by modern practitioners it is made to apply not only to tumors of this kind, but to ſuch as are formed by blood effuſed from arteries into the contiguous parts. There are three ſpecies; the true or encyſted, the falſe or diffuſed, and the varicoſe aneuriſm.

The *true* or *encyſted aneuriſm*, when ſituated near the ſurface of the body, produces a tumor at firſt ſmall and circumſcribed; the ſkin retains its natural appearance; when preſſed by the fingers, a pulſation is evidently diſtinguiſhed; and with very little force the contents of the ſwelling may be made to diſappear; but they immediately return upon removing the preſſure. By degrees the ſwelling increaſes, and becomes more prominent; but ſtill the patient does not complain of pain: on preſſure the tumor continues of an equal ſoftneſs, and is compreſſible. After this the ſwelling becomes large, the ſkin turns paler than uſual, and in more advanced ſtages œdematous: the pulſe ſtill continues; but parts of the tumor become firm from the coagulation of the contained blood, and yield little to preſſure: at laſt the ſwelling increaſes in a gradual manner, and is attended with a great degree of pain. The ſkin turns livid, and has a gangrenous appearance. An oozing of bloody ſerum occurs from the integuments; and, if a real mortification do not take place, the ſkin cracks in different parts; and the artery being now deprived of the uſual reſiſtance, the blood burſts out with ſuch force as to occaſion the almoſt immediate death of the patient. Thus the diſeaſe terminates in the large cavities of the body; but in the extremities we can, by means of the tourniquet, prevent the ſudden termination of the diſeaſe.

When affections of this kind happen in the larger arteries, the effects produced upon the neighbouring parts are often ſurpriſing: the ſoft parts not only yield to a great extent, but even the bones frequently undergo a great degree of derangement.

The *falſe* or *diffuſed aneuriſm* conſiſts in a wound or rupture in an artery, producing, by the blood thrown out of it, a ſwelling in the contiguous parts. It is moſt frequently produced by a wound made directly into the artery.

The following is the uſual progreſs of the diſorder. A tumor, about the ſize of a horſe-bean, generally riſes at the orifice in the artery ſoon after the diſcharge of the blood has been ſtopped by compreſſion. At firſt it is ſoft, has a ſtrong degree of pulſation, and yields a little to preſſure, but cannot be made entirely to diſappear; for here the blood forming the tumor being at reſt begins to coagulate. If not improperly treated by much preſſure, it generally remains nearly of the ſame ſize for ſeveral weeks. The enlargement however proceeds more rapidly in ſome caſes than in others. Inſtances have occurred of the blood being diffuſed over the whole arm in the ſpace of a few hours; while, on the contrary, ſwellings of this kind have been many months, nay even years, in arriving at any conſiderable ſize.

As the tumor becomes larger it does not, like the true aneuriſm, grow much more prominent, but rather ſpreads and diffuſes itſelf into the ſurrounding parts. By degrees it acquires a firm conſiſtence; and the pulſation, which was at firſt conſiderable, gradually diminiſhes till it is ſometimes ſcarcely perceptible. If the blood at firſt thrown out proceed from an artery deeply ſeated, the ſkin preſerves its natural appearance till the diſorder is far advanced: but when the blood gets at firſt into contact with the ſkin, the parts become inſtantly livid, indicating the approach of mortification; and a real ſphacelus has ſometimes been induced. The tumor at firſt produces little uneaſineſs; but as it increaſes in ſize, the patient complains of ſevere pain, ſtiffneſs, numbneſs, and immobility of the whole joint; and theſe ſymptoms continuing to augment, if the artery be large, and aſſiſtance not given, the teguments at laſt burſt, and death muſt enſue.

When an artery is punctured through a vein, as in blood-letting at the arm, the blood generally ruſhes into the yielding cellular ſubſtance, and there ſpreads ſo as to ſhut the ſides of the vein together. But in ſome inſtances where the artery happens to be in contact with the vein, the communication opened has been preſerved; and the vein not being ſufficiently ſtrong for reſiſting the impulſe of the artery, muſt conſequently be dilated. This is a *varicoſe aneuriſm.* It was firſt accurately deſcribed by Dr. Hunter, and ſince that time has been frequently obſerved by different practitioners. Here the ſwelling is entirely confined to the veins. Soon after the injury the vein immediately communicating with the artery begins to ſwell, and enlarge gradually. If there be any conſiderable communications in the neighbourhood, the veins which form them are alſo enlarged. The tumor diſappears upon preſſure, the blood contained in it being chiefly puſhed forwards in its courſe towards the heart; and when the tumor is large, there is a ſingular tremulous motion, attended with a perpetual hiſſing noiſe, as if air was paſſing into it through a ſmall aperture.

If a ligature be applied upon the limb, immediately below the ſwelling, tight enough to ſtop the pulſe in the under part of the member, the ſwelling diſappears by preſſure, but returns immediately upon the preſſure being removed. If after the ſwelling is removed by preſſure, the finger be placed upon the orifice in the artery, the veins remain perfectly flaccid till the preſſure is taken off. If the trunk of the artery be compreſſed above the orifice ſo as effectually to ſtop the circulation, the tremulous motion and hiſſing immediately ceaſe; and if the veins be now emptied by preſſure, they remain ſo till the compreſſion upon the artery be removed. If the vein be compreſſed a little above as well as below the tumor, all the blood may generally, though not always, be puſhed through the orifice into the artery; from whence it immediately returns on the preſſure being diſcontinued.

When the diſeaſe has continued long, and the dilatation of the veins has become conſiderable, the trunk of the artery above the orifice generally becomes greatly enlarged, while that below becomes proportionably ſmall; of conſequence the pulſe in the under part of the member is always more feeble than in the ſound limb of the oppoſite ſide.

The *cauſes producing aneuriſms*, in general, are a natural diſeaſe of the arteries. Thus a partial debility of their coats may readily produce the diſeaſe; or they may ariſe, eſpecially in the internal parts of the body, from great bodily exertions. They are likewiſe produced by wounds of the coats of the arteries, as now and then happens in blood-letting at the arm; or from acrid matter contained in a neighbouring ſore; or from the deſtruction of ſurrounding parts, by which the natural ſupport is removed.

Aneuriſms have frequently been miſtaken for abſceſſes and other collections of matter, and have been laid open by inciſion; on which account great attention is ſometimes required to make the proper diſtinction. In the commencement of the diſeaſe, the pulſation in the tumor is commonly ſo ſtrong, and other concomitant circumſtances ſo evidently point out the nature of the diſorder, that little or no doubt reſpecting it can ever take place; but in the more advanced ſtages of the diſeaſe, when the ſwelling has become large and has loſt its pulſation, nothing but a minute attention to the previous hiſtory of the caſe can enable the practitioner to form a judgment of its nature.

Aneuriſms may be confounded with ſoft encyſted tumors, ſcrophulous ſwellings, and abſceſſes ſituated ſo near to an artery as to be affected by its pulſation. But one ſymptom, when connected with ſtrong pulſation, may always lead to a certain determination that the ſwelling is of the aneuriſmal kind, viz. the contents of the tumor being made eaſily to diſappear upon preſſure, and their returning on the compreſſure being removed. The want of this circumſtance, however, ought not to convince us that it is not of that nature; for it frequently happens, eſpecially in the advanced ſtages of aneuriſms, that their contents become ſo firm that no effect is produced upon them by preſſure. Hence the propriety, in doubtful caſes, of proceeding as if the diſeaſe was clearly of the aneuriſmal kind.

In the *prognoſis*, three circumſtances are chiefly to be attended to; the manner in which the diſeaſe appears to have been produced, the part of the body in which the ſwelling is ſituated, and the age and habit of body of the patient.

If an aneuriſm has come forward in a gradual manner, without any apparent injury done to the part, and not ſucceeding any violent bodily exertion, there will be reaſon to ſuppoſe that the diſeaſe depends upon a general affection either of the trunk in which it occurs, or of the whole arterial ſyſtem. In ſuch caſes art can give little aſſiſtance: whereas if the tumor has ſucceeded an external accident, an operation may be attended with ſucceſs.

In the *varicoſe aneuriſm* a more favourable prognoſis may generally be given than in either of the other two ſpecies. It does not proceed ſo rapidly; when it has arrived at a certain length, it does not afterwards acquire much additional ſize; and it may be ſuſtained without much inconvenience for a great number of years. As long as there is reaſon to expect this, the hazard which almoſt always attends the operation ought to be avoided.

In the ſecond volume of the London Medical Obſervations, two caſes are related by Dr. Hunter of the varicoſe aneuriſm. One of them at that time was of fourteen years' ſtanding, and the other had ſubſiſted for five years, without there being any neceſſity for an operation. And in vol. iii. of the ſame work, a ſimilar caſe of five years' duration is related by Dr. Cleghorn.

In a letter, afterwards, from Dr. Hunter to Mr. Benjamin Bell, the doctor ſays, "The lady in whom I firſt obſerved the varicoſe aneuriſm is now living at Bath, in good health, and the arm is in no ſenſe worſe, although it is now thirty-five years ſince ſhe received the injury:" and the doctor farther obſerves, that he never heard of the operation being performed for the varicoſe aneuriſm when known to be ſuch.

Mr. Bell ſays, he was informed by Dr. William Cleghorn, of Dublin, that the caſe of varicoſe aneuriſm, related in the third volume of the London Medical Obſervations, remained nearly in the ſame ſtate as at the time that account was made out, which included a period of at leaſt twenty years; only that the veins were rather more enlarged. The patient recovered, and the limb became nearly as ſtrong and ſerviceable as the other. Mr. Pott alſo met with three different inſtances of this ſpecies of aneuriſm; and obſerves, that the operation never became neceſſary in any of them.

Among other inſtances of varicoſe aneuriſm which have appeared here, a young man from Paiſly was examined, ſeveral years ago, by different ſurgeons of this place. The diſeaſe was very clearly marked, and no operation was adviſed. He was afterwards found ſerving in the navy, where he underwent great fatigue without any inconvenience from the aneuriſm, though then of thirteen years' ſtanding.

But though this aneuriſm, when it has arrived at a certain ſize, commonly remains ſtationary, and may be borne without much inconvenience for a long time, this is not always the caſe; for ſome inſtances have occurred where the diſeaſe was attended with great uneaſineſs, and where the operation was performed with much difficulty.

In judging further of the probable event of aneuriſms in general, the ſituation of the tumor next requires attention. When it is ſo ſituated that no ligature or effectual compreſſion can be applied for ſtopping the circulation in the part, if the artery be large, there would be the greateſt danger in opening it. In this caſe, therefore, the moſt fatal conſequences are to be apprehended.

When aneuriſms are ſituated near the upper parts of the extremities, ſurgeons have been hitherto doubtful whether, after tying up the humeral or femoral arteries, the lower parts of the limb would be ſupplied with blood; and though ſeveral ſucceſsful inſtances of performing that operation have been publiſhed, the ſucceſs has been pretty generally aſcribed to unuſual branching of the great arteries of thoſe patients, on whom the operation was performed above the aneuriſm. Mr. John Bell, however, in his late very ingenious and important Diſcourſes on Wounds, has proved, to our ſatisfaction at leaſt, that the inoſculations which take place between the internal iliac and the arteries of the leg, by means of the glutæal arteries and the profunda femoris, are in every caſe ſufficient to ſupply nouriſhment to the limb; that the ſame is the caſe in the arm; and that therefore in every aneuriſm, even of the humeral or femoral artery, we ought to perform the operation. Several inſtances of ſucceſs are there related; among others, an operation performed by Mr. J. Bell himſelf, which, as it is perhaps the greateſt that has hitherto been performed, we ſhall here abridge for the gratification of our readers. A leech-catcher fell as he was ſtepping out of a boat; and a pair of long-pointed ſciſſars pierced his hip, exactly over the ſciatic notch, where the great iliac artery comes out from the pelvis. The artery bled furiouſly: the patient fainted. The ſurgeon eaſily ſtopped up the wound, as it was very narrow and deep, and healed it. A great tumor ſoon formed. The man travelled from the north country in ſix weeks to the Edinburgh infirmary, with a prodigious tumor of the hip, the thigh rigidly contracted, the ham bent, the whole leg ſhrunk, and cold and uſeleſs. There was no pulſation nor retroceſſion of blood on preſſure; but the diſtenſion was attended with great pain, and the man was extremely anxious to have an operation performed. Though there was little doubt of its being aneuriſm, it might be a great abſceſs. It was reſolved, therefore, to make a ſmall inciſion, and juſt touch the bag with the point of a lancet, and if it contained blood, a full conſultation was to be called. Mr. Bell accordingly made an inciſion two inches and a half in length; the great faſcia formed the coat of the tumor, and under it were ſeen the fibres of the great glutæus muſcle. As ſoon as it was opened at one point great clots of blood came out; and Mr. Bell, after being certain that it was an aneuriſm of the great artery of the thigh, cloſed up the wound with a tent-like compreſs, put the patient to bed, and a pupil held his hand on the hip. This was done at one o'clock; at four the conſultation met, and the operation was performed. On making an inciſion eight inches long, the blood was thrown out with a wiſhing noiſe, and with ſuch impetuoſity that the aſſiſtants were covered with it. In a moment twenty hands were about the tumor, and the bag was filled with ſponges and cloths of all kinds; the blood, however, ſtill made its way; and the man, who had ſupported himſelf on his elbow, fell down; his arms and head hung down, he uttered two or three heavy groans, and they thought him dead. At that critical moment Mr. Bell ran the biſtoury upwards and downwards; and at once made the wound two feet long; thruſt his hand to the bottom of the tumor, felt the warm jet of blood, put his finger on the mouth of the artery, the pulſe of which he felt diſtinctly; which firſt aſſured him that the man was alive. The artery was then tied, and when Mr. Bell lifted up his finger it was diſcovered to be the poſterior iliac; that it had been cut fairly acroſs, and had bled with open mouth. The patient was ſo low, that after dreſſing the wound they were obliged to bring in a bed, and leave him to ſleep in the operation room. He was cured of this great wound in leſs than ſeven months, and afterwards recovered the uſe of his leg completely.

In every caſe of aneuriſm, the uſe of *preſſure* has been indiſcriminately recommended, not only in the incipient period of the diſeaſe, but even in its more advanced ſtages.

In the *diffuſed* or *falſe aneuriſm*, as preſſure cannot be applied to the artery alone, without at the ſame time affecting the refluent veins; and as this, by producing an increaſed reſiſtance to the arterial pulſations, muſt force an additional quantity of blood to the orifice in the artery; no advantage is to be expected from it, though it may be productive of miſchief.

In the early ſtages of *encyſted aneuriſm*, while the blood can be yet preſſed entirely out of the ſac into the artery, it often happens, by the uſe of a bandage of ſoft and ſomewhat elaſtic materials, properly fitted to the part, that much may be done in preventing the ſwelling from receiving any degree of increaſe; and on ſome occaſions, by the continued ſupport thus given to the weakened artery, complete cures have been at laſt obtained. In all ſuch caſes, therefore, particularly in every inſtance of the varicoſe aneuriſm, much advantage may be expected from moderate preſſure.

But preſſure, even in encyſted aneuriſm, ought never to be carried to any great length; for tight bandages, by producing an immoderate degree of reaction in the containing parts to which they are applied, inſtead of anſwering the purpoſe for which they were intended, have evidently the contrary effect. Indeed the greateſt length to which preſſure in ſuch caſes ought to go, ſhould be to ſerve as an eaſy ſupport to the parts affected, and no farther.

In *performing the operation* for aneuriſm, the firſt ſtep ought to be to obtain a full command of the circulation in the inferior part of the member by means of the tourniquet. This being done, the patient ſhould be ſo placed that the diſeaſed limb, on being ſtretched on a table, is found to be of a proper height for the ſurgeon; who, as the operation is generally tedious, ought to be ſeated. The limb being properly ſecured by an aſſiſtant, the operator is now, with the common ſcalpel, to make an inciſion through the ſkin and cellular ſubſtance along the whole courſe of the tumor; and as freedom in the remaining parts of the operation is here a matter of much importance, it is even of uſe to carry this external inciſion half an inch or ſo both above and below the fartheſt extremities of the ſwelling.

All the effuſed blood ought then to be wiped off by means of a ſponge; and the ſofteſt part of the tumor being diſcovered, an opening ought there to be made into it with a lancet, large enough for admitting a finger of the operator's left hand. This being done, and the finger introduced into the cavity of the tumor, it is now to be laid open from one extremity to the other, by running a blunt-pointed biſtoury (Plate I. fig. 12.) along the finger, from below upwards, and afterwards from above downwards, ſo as to lay the whole cavity fairly open.

The cavity of the tumor being thus laid freely open, all the coagulated blood is to be taken out by the fingers of the operator, together with a number of tough membranous filaments commonly found there. The cavity of the tumor is now to be rendered quite dry, and free from the blood which, on the firſt opening of the ſwelling, is diſcharged into it from the veins in the inferior part of the member: the tourniquet is then to be ſlackened, to diſcover, not only the artery itſelf, but the opening into it, from whence the blood collected in the tumor has been all along diſcharged. This being done, the next point to be determined is the manner of *ſecuring this* *opening* into the artery, ſo as to prevent in future any further effuſion of blood. Various means have been propoſed for accompliſhing this; but the effects of all of them may be comprehended under the three following heads:

1. The effects of ligature upon a large artery having on ſome occaſions proved fatal to the inferior part of the member, it was long ago propoſed, that ſo ſoon as the opening into the artery has been diſcovered, inſtead of applying a ligature round it, which for certain is to obliterate its cavity entirely, a piece of agaric, vitriol, alum, or any other *aſtringent* ſubſtance, ſhould be applied to the orifice, in order, if poſſible, to produce a reunion of its ſides.

2. Upon the ſame principle with the preceding, viz. that of ſtill preſerving the circulation in the artery, it was ſeveral years ago propoſed by an eminent ſurgeon of Newcaſtle, Mr. Lambert, that the orifice in the artery ſhould be ſecured by means of the *twiſted ſuture*. A ſmall needle being puſhed through the edges of the wound, they are then directed to be drawn together by a thread properly twiſted round the needle, as was formerly directed when treating of ſutures.

Strong objections, however, occur to both of theſe methods. In the firſt place, no aſtringent application with which we are acquainted is poſſeſſed of ſuch powers as to deſerve much confidence. In almoſt every inſtance in which they have been uſed, the hæmorrhagy has recurred again and again, ſo as to prove very diſtreſſing, not only to the patient, but to the practitioner in attendance; little or no attention is therefore to be paid to remedies of this kind in ordinary practice.

Mr. Lambert's method of ſtitching the orifice in the artery is certainly a very ingenious propoſal; and would, in all probability, at leaſt in moſt inſtances, prove an effectual ſtop to all further diſcharge of blood: but as we have yet only one inſtance of its ſucceſs, little can be ſaid about it. Two material objections, however, ſeem to occur to this practice. One is, that in the operation for the aneuriſm, in almoſt every inſtance, a very few only excepted, the artery lies at the back-part of the tumor; ſo that when all the collected blood is removed, there is ſuch a depth of wound that it muſt be always a very difficult matter, and on many occaſions quite impracticable, to perform this nice operation upon the artery with that attention and exactneſs which, in order to enſure ſucceſs, it certainly requires. But there is another very material objection. By introducing a needle through the ſides of the orifice, and drawing theſe together by a ligature, the cavity of the artery muſt undoubtedly be at that point much diminiſhed. Indeed Mr. Lambert, in his account of the caſe in which this operation was performed, acknowledges that the diameter of the artery was thereby diminiſhed. Now the paſſage of the blood being thus contracted at one point, the impulſe upon that particular part muſt be very conſiderable: ſo that the very remedy employed for the cure of one ſpecies of aneuriſm will, in all probability, prove a very powerful agent in inducing another; for the blood being thus obſtructed in its uſual courſe, there will be no ſmall danger incurred of a dilatation being produced immediately above this preternatural ſtricture.

3. Neither of the methods we have yet been conſidering being found eligible for ſecuring the orifice in the artery, we ſhall now proceed to deſcribe *the ordinary manner of performing this operation*; which conſiſts in obliterating the arterial cavity entirely by means of ligatures.

The artery being laid bare, in the manner directed, and all the coagulated blood being carefully removed from the cavity of the tumor, on the tourniquet being now ſlackened ſo as to bring the orifice in the artery into view, a ſmall probe, curved at the extremity, is to be introduced at the opening, in order to raiſe the artery from the neighbouring parts, ſo as that the ſurgeon may be enabled with certainty to paſs a ligature round it, without comprehending the contiguous nerves, which in general run very near to the large blood-veſſels of a limb. By this precaution the nerves may be always avoided; and by doing ſo, a great deal of miſchief may be prevented, which otherwiſe might ſupervene. When the diſorder is ſituated either in the ham, or in the uſual part of blood-letting in the arm, bending the joints of the knee, or of the elbow, as it relaxes the artery a little, renders this part of the operation more eaſily effected than when the limbs are kept fully ſtretched out.

The artery being thus gently ſeparated from the contiguous parts, a firm waxed ligature muſt be paſſed round it, about the eighth part of an inch or ſo above the orifice, and another muſt in the ſame manner be introduced at the ſame diſtance below it.

The ligatures being both finiſhed in the manner directed, the tourniquet is now to be made quite looſe; and if no blood is diſcharged at the orifice in the artery, we may then reſt ſatisfied that the operation is ſo far properly completed.

The wound is now to be lightly covered with ſoft lint, with a pledget of any emollient ointment over the whole; and a compreſs of linen being applied over the dreſſings, all the bandage in any degree requiſite is two or three turns of a roller above, and as many below the centre of the wound, making it preſs with no more tightneſs than is abſolutely neceſſary for retaining the application we have juſt now mentioned.

The patient being now put into bed, the member ſhould be laid in a relaxed poſture upon a pillow, and ought to be ſo placed as to create the leaſt poſſible uneaſineſs from the poſture in which it is laid.

As the operation for the aneuriſm is always tedious, and produces much pain and irritation, a full doſe of laudanum ſhould be given immediately on the patient being got into bed. In order to diminiſh ſenſibility during ſome of the more capital operations, different trials have been made of opiates given an hour or ſo before the operation. On ſome occaſions this proved evidently very uſeful; but in others it ſeemed to have the contrary effect; particularly in weak nervous conſtitutions, in which with any doſes, however ſmall, they appeared to be rendered more irritable and more ſuſceptible of pain than if no opiate had been given. Immediately after this operation, however, an opiate ought to be exhibited, to be repeated occaſionally according to the degrees of pain and reſtleſſneſs.

In ſome few caſes of aneuriſm it has happened that the pulſe in the under part of the member has been diſcovered immediately after the operation. This, however, is a very rare occurrence: for as this diſorder is ſeldom met with in any other part than at the joint of the elbow as a conſequence of blood-letting, and as it rarely happens that the brachial artery divides till it paſſes an inch or two below that place, the trunk of this artery is therefore moſt frequently wounded; and when, accordingly, the ligature, in this operation, is made to obliterate the paſſage of almoſt the whole blood which went to the under part of the arm, there cannot be the leaſt reaſon to expect any pulſation at the wriſt, till in a gradual manner the anaſtomoſing branches of the artery have become ſo much enlarged as to tranſmit ſuch a quantity of blood to the inferior part of the member as is ſufficient for acting as a ſtimulus to the larger branches of the artery.

Immediately after the operation, the patient complains of an unuſual numbneſs or want of feeling in the whole member; and as it generally, for a few hours, becomes cold, it is therefore right to keep it properly covered with warm ſoft flannel; and in order to ſerve as a gentle ſtimulus to the parts below, moderate frictions appear to be of uſe. In the ſpace of ten or twelve hours from the operation, although the numbneſs ſtill continues, the heat of the parts generally begins to return; and it frequently happens, in the courſe of a few hours more, that all the inferior part of the member becomes even preternaturally warm.

Immediately after this operation the want of feeling in the parts is often very great; and in proportion as the circulation in the under part of the member becomes more conſiderable, the degree of feeling alſo augments. If we could ſuppoſe the nerves of the parts below to be always included in the ligature with the artery, that numbneſs which ſucceeds immediately to the operation might be eaſily accounted for; but it has been alſo known to happen when nothing but the artery was ſecured by the ligature.

In the mean time, the patient being properly attended to as to regimen, by giving him cordials and nouriſhing diet when low and reduced, and confining him to a low diet if his conſtitution is plethoric, the limb being ſtill kept in an eaſy relaxed poſture, towards the end of the fourth or fifth day, ſometimes much ſooner, a very weak feeble pulſe is diſcovered in the under part of the member, which becoming ſtronger in a gradual manner, the patient in the ſame proportion recovers the uſe and feeling of the parts.

So ſoon as there is an appearance of matter having formed freely about the ſore, which will ſeldom happen before the fifth or ſixth day, an emollient poultice ſhould be applied over it for a few hours, in order to ſoften the dreſſings, which may be then removed. At this time the ligatures might be taken away; but as their continuance for a day or two longer can do no harm, it is better to allow them to remain till the ſecond or third dreſſing, when they either drop off themſelves, or may be taken away with perfect ſafety. The dreſſings, which ſhould always be of the ſofteſt materials, being renewed every ſecond or third day according to the quantity of matter produced, the ſore is in general found to heal very eaſily; and although the patient may for a conſiderable time complain of great numbneſs and want of ſtrength in the whole courſe of the diſeaſed limb, yet in moſt inſtances a very free uſe of it is at laſt obtained.

Very often after the artery ſeems to be ſecured it gives way, and fatal hemorrhagies enſue; nor is the patient free from this danger for a great length of time. In one of the late Mr. Hunter's operations the artery gave way on the 26th day. It is to this difficulty of procuring adheſion between the ſides of the artery, which may frequently be diſeaſed to *ſome diſtance above the ligature*, that a great part of the danger of this operation is to be aſcribed.

The ingenious practitioner, whoſe name has juſt now occurred, urged by the ill ſucceſs attending the common means of treating aneuriſm, ſuggeſted a mode of operating which underwent many trials in the London and Edinburgh hoſpitals, and of which the following account was publiſhed by Mr. Home, in the Tranſactions of the London Society for the improvement of Medicine and Surgery.

The aneuriſm of the *popliteal artery*, occurring frequently, and generally proving fatal to the patient, was the diſeaſe on which the extraordinary abilities of Mr. Hunter were exerciſed in the inſtance now to be noticed.

Mr. Home introduces the ſubject with ſome remarks on the almoſt conſtant failure of the common treatment, and a deſcription of the diſeaſe called *aneuriſm*, which, though remarkable for its preciſion, we need not repeat. He then proceeds thus:

" The *popliteal aneuriſm*, which we are at preſent to conſider, is the diſeaſe above mentioned, affecting the trunk of the popliteal artery, which runs down between the two ham-ſtrings of the thigh. From the ſituation of the tumor, on whatever ſide of the artery the dilatation is produced, it will be diſtinctly felt in the hollow between the ham-ſtrings, and will be readily aſcertained by a pulſation to be felt in every part of the tumor; it ſeems to be one of the moſt frequent ſituations of aneuriſm; and though it may be difficult to aſcertain whether it occurs ſo commonly as in the aorta itſelf, it is certainly found oftener in this artery than in any other branch which the aorta ſends off. This circumſtance, as far as I know, has not hitherto been accounted for, and what is rather curious, in many recent inſtances of this diſeaſe, the patients have been coachmen and poſtilions. The popliteal aneuriſm has been in general ſuppoſed to ariſe from a weakneſs in the coats of the artery, independent of the preſence of diſeaſe; if this were true, we might reaſonably conclude, that, except in the part preternaturally dilated, the veſſel remained in a ſound ſtate, which would naturally ſuggeſt the mode of practice generally recommended, viz. opening the ſac, tying up the artery above and below it, leaving the bag to ſuppurate, and afterwards heal up like any common ſore.

" Mr. Hunter finding an *alteration of ſtructure* in the *coats of the artery* previous to its dilatation, and that the artery immediately above the ſac *ſeldom unites* when tied up in the operation for the aneuriſm, ſo that as ſoon as the ligature comes away, the ſecondary bleeding deſtroys the patient, was led to conclude, that a previous diſeaſe took place in the coats of the artery, in conſequence of which it admitted of dilatation capable of producing aneuriſm. But not ſatisfied with the experiments on frogs, given by Haller in ſupport of the opinion that weakneſs alone was ſufficient to produce the dilatation, he reſolved to try the reſult in a quadruped, which, from the veſſels being very ſimilar in their ſtructure to thoſe of the human ſubject, would be more likely to aſcertain the truth or fallacy of Haller's opinion. That the experiment might have as much as poſſible the chances moſt likely to produce aneuriſm, the carotid artery, as being near the heart, was ſelected for that purpoſe."

The propoſed experiments having been made on the dog, Mr. Home deſcribes their reſults as follows:

" The *reſults of theſe experiments*," ſays he, " confirmed Mr. Hunter in his opinion, that *the artery*, in caſes of aneuriſm, is in *a diſeaſed ſtate*; and led him to believe, that the diſeaſe often extends along the artery for ſome way from the ſac; and that the cauſe of failure in the common operation ariſes from tying a diſeaſed artery, which is incapable of union, in the time neceſſary for the ſeparating of the ligature.

" The femoral and popliteal arteries are portions of the ſame trunk, preſenting themſelves on different ſides of the thigh, and are readily come at in either ſituation; but where the artery is paſſing from the one ſide to the other, it is more buried in the ſurrounding parts, and cannot be expoſed without ſome difficulty.

" In performing the *operation for the popliteal aneuriſm*, eſpecially when the tumor is large, the ligature is commonly applied on the artery at that part where it emerges from the muſcles. This mode of performing the operation will be found inadequate, if the diſeaſe of the artery extends above the ſac; for if the artery ſhould afterwards give way, there will not be a ſufficient length of veſſel remaining, to allow of its being again ſecured in the ham. To follow the artery up through the inſertion of the triceps muſcle, to get at a portion of it where it is ſound, becomes a very diſagreeable part of the operation: and to make an inciſion upon the fore part of the thigh, to get at and ſecure the femoral artery, would be breaking new ground; a thing to be avoided, if poſſible, in all operations.

"Mr. Hunter, from having made theſe obſervations, was led to propoſe, that in this operation the artery ſhould be taken up in the anterior part of the thigh, at ſome diſtance from the diſeaſed part, ſo as to diminiſh the riſk of hæmorrhage, and admit of the artery being more readily ſecured ſhould any ſuch accident happen. The force of the circulation being thus taken off from the aneuriſmal ſac, the progreſs of the diſeaſe would be ſtopped; and he thought it probable, that if the parts were left to themſelves, the ſac, with its contents, might be abſorbed, and the whole of the tumor removed; which would render any opening into the ſac unneceſſary."

Mr. Hunter performed this operation at St. George's hoſpital, in the following inſtances:

Case I. "The patient was a coachman, 45 years of age; he was admitted into the hoſpital in December, 1785, with a popliteal aneuriſm, which he had firſt perceived three years previous to his admiſſion, and had obſerved it gradually to increaſe during the whole of that period. It was ſo large as to diſtend the two ham-ſtrings laterally, and make a very conſiderable riſing between them; the pulſation was very diſtinct, and to be felt on every ſide of the tumor. The leg and foot of that ſide were ſo ſwelled as to be much thicker than the other, and were of a mottled brown colour; the ſwelling was not of the œdematous kind, but felt firm and brawny, probably from the extravaſation of coagulable lymph; the leg retained its natural ſhape, excepting that it was larger. Previous to performing the operation, a tourniquet was applied upon the upper part of the thigh, but not tightened, that the parts might be left as much in their natural ſituation as poſſible.

"The operation was begun by making an inciſion on the anterior and inner part of the thigh, rather below its middle, which inciſion was continued obliquely acroſs the inner edge of the ſartorius muſcle, and made large to give room for the better performing of whatever might be thought neceſſary in the courſe of the operation. The faſcia which covers the artery was then laid bare about three inches in length, after which the artery itſelf was plainly felt. A ſlight inciſion, about an inch long, was then made through this faſcia, along the ſide of the veſſel, and the faſcia diſſected off; by this means the artery was expoſed. Having diſengaged the artery from its lateral connections by the knife, and from the other adhering parts by the help of a thin ſpatula, a double ligature was paſſed behind it by means of an eyed probe. The doubling of the ligature brought through by the probe, was cut ſo as to form two ſeparate ligatures. The artery was now tied by both theſe ligatures, but ſo ſlightly, as only to compreſs the ſides together. A ſimilar application of ligature was made a little lower. The reaſon for having four ligatures, was to compreſs ſuch a length of artery as might make up for the want of tightneſs, it being wiſhed to avoid great preſſure on the veſſel at any one part. The ends of the ligatures were carried directly out at the wound, the ſides of which were now brought together, and ſupported by ſticking-plaſter and a linen roller, that they might unite by the firſt intention.

" The limb was found, ſome hours after the operation, not only to retain its natural heat, but even to be warmer than the other leg. The ſecond day after the operation, the brawny firmneſs of the leg was conſiderably diminiſhed, it was become ſoft, looſe, and a good deal ſmaller, and the aneuriſmal tumor had loſt more than one third of its ſize.

" Nothing could ſhew more plainly the action of the abſorbents, than the change the leg had undergone in ſo ſhort a time; the diminution of the tumor probably ariſing from the fluid blood which it contained having paſſed into collateral branches, or into the tibial artery.

" The fourth day, on the removal of the dreſſings, the edges of the wound were found united through its whole length, excepting where prevented by the ligatures: there was neither pain nor tumefaction in the part; but the aneuriſmal tumor was the ſame as on the ſecond day.

" On the ninth day after the operation, there was a conſiderable diſcharge of blood from the part where the ligatures paſſed out; a tourniquet was therefore applied on the artery above, which ſtopped the bleeding; and, although the tourniquet was taken off a few hours after, no blood followed. The head of a roller was then placed upon the wound, in the direction of the artery, and over that the tourniquet, which was not, however, tightened more than was thought ſufficient to take off the impetus of the blood in that portion of the artery.

" On the tenth day appearances were much the ſame, only that between the compreſs and the knee there appeared a little fullneſs, like beginning inflammation. On the eleventh day this was gone off, and on the fifteenth ſome of the ligatures came away, followed by a ſmall diſcharge of matter, the tumor in the ham being leſſened. On the ſeventeenth day the parts ſurrounding the aneuriſmal tumor were more reduced, and pliable, ſo that it was diſtinctly to be felt.

" About the latter end of January, 1786, ſix weeks after the operation, the patient went out of the hoſpital, the tumor at that time being ſomewhat leſſened, and rather firmer to the feel. He was ordered to come to the hoſpital once every week, and, in the mean time, to make ſome degree of preſſure, by application of a compreſs and bandage, with a view to excite the abſorbents to action, which in moſt caſes has a good effect.

"About the middle of February the tumor had decreaſed, and was become ſtill firmer. March the 8th, the wound, which had cicatrized, broke out again, and the patient was taken into the hoſpital. About the 8th of April, ſome of the remaining thread of the ligature came away, and an inflammation appeared upon the upper part of the thigh. In the middle of May a ſmall abſceſs broke at ſome diſtance from the old cicatrix, at which opening ſome matter was diſcharged, but no pieces of ligature were obſerved. Several ſmall threads were, at different times, diſcharged from the old ſore, and the ſwelling ſubſided; but the thigh ſoon ſwelled again to a greater ſize than before, attended with conſiderable pain. In the beginning of July a piece of ligature, about one inch in length, came away, after which the ſwelling went off entirely, and he left the hoſpital the 8th of July, at which time there remained no appearance of tumor in the ham, he being in every reſpect well.

"After leaving the hoſpital, the man returned to his uſual occupation of driving a hackney-coach; and being, from the nature of his employment, much expoſed to cold, in March, 1787, he was ſeized with a fever of the remittent kind, which carried him off. He had not made any complaint of the limb on which the operation had been performed from the time of his leaving the hoſpital.

"He died on the 1ſt of April, 1787, fifteen months after the operation; and leave was procured, with ſome trouble and conſiderable expence, to examine the limb, ſeven days after death, at which time it was entirely free from putrefaction.

"The cicatrix on the anterior part of the thigh was ſcarcely diſcernible, but the parts under it felt hard. The ham had no appearance of tumor, and was to the eye exactly like that of the other limb; there was, however, a ſolid tumor perceptible to the touch, filling up the hollow between the two angles of the thigh-bone.

"The femoral artery and vein were taken out above the giving off the branch called profunda, and a little below the diviſion into the arteriæ tibiales and intero ſſea. The arteries and veins that were pervious being injected, the whole was carefully diſſected.

"The femoral artery was impervious from its giving off the arteria profunda as low as the part included in the ligature, and at that part there was an oſſification for about an inch and a half along the courſe of the artery, of an oval form, the rim of which was ſolid, becoming thinner towards the center, and not bony, but ligamentous. Below this part, the femoral artery was pervious down to the aneuriſmal ſac, and contained blood, but did not communicate with the ſac itſelf, having become impervious juſt at the entrance.

"What remained of the aneuriſmal ſac was ſomewhat larger than a hen's egg, but more oblong, and a little flattened, extending along the artery below for ſome way; the blood preſſing with greater force in that direction, and diſtending that part ſo as in ſome meaſure to give the appearance of a ſeparate bag. The ſac was perfectly circumſcribed, not having the ſmalleſt remains of the lower orifice into the popliteal artery; whether this aroſe from the artery being preſſed upon by the inferior portion of the ſac, as appears to be the caſe in common, or was in conſequence of the ſac contracting after the operation, I will not pretend to determine; but it contained a ſolid coagulum of blood, which adhered to its internal ſurface. A ſection made of this coagulum, appeared to be compoſed of concentric lamellæ, uniform in colour and conſiſtence.

" The popliteal artery a little way below the aneuriſmal ſac was joined by a ſmall branch, very much contracted, which muſt have ariſen either from the profunda, or the trunk of the femoral artery. About two inches below the ſac, the popliteal gave off, or divided into the tibiales.

" The profunda was of the uſual ſize, but a good deal oſſified for ſome length after leaving the femoral artery; the two tibials, where they go off from the popliteal, were in the ſame ſtate.

" The trunk of the femoral vein, where it paſſed along the ſide of the tumor, muſt have been obliterated; for at this part it appeared to ſend off three equal-ſized branches, paſſing over different parts of the aneuriſmal ſac: theſe muſt have been dilated branches, none of them having the courſe which the trunk of the vein ſhould have purſued.

" Theſe appearances throw ſome light upon the changes which took place in the limb after the operation. The ligature upon the femoral artery impeded the paſſage of the blood into the ſac ſo much as to allow its contents to coagulate, and render the opening into it from the artery impervious. By this a ſtop was only put to the increaſe of the tumor, its reduction to the ſize met with in the dead body, muſt have been the effect of abſorption."

The concluſion Mr. Home draws from this account is, that ſimply *taking off the force of the circulation from the aneuriſmal artery, is ſufficient to effect a cure* of the diſeaſe, or at leaſt to put a ſtop to its progreſs, and leave the parts in a ſituation from which the actions of the animal economy are capable of recovering them. Mr. Home mentions a caſe of aneuriſm that recovered *without an operation*, and in which the mode of recovery depended upon this very principle.

" The aneuriſm," ſays he, " was in the femoral artery, and the ſwelling appeared upon the anterior part of the thigh, a little above the middle, extending upwards nearly to Poupart's ligament: an attempt was made, by compreſſing the artery above the tumor, by means of an inſtrument ſomewhat reſembling a ſteel truſs, to give the blood in the ſac a chance of coagulating, and by that means to put a ſtop to the progreſs of the diſeaſe. But, from the pain which it occaſioned, every attempt to make a permanent compreſſion on the artery proved ineffectual. The tumor increaſed to a very conſiderable ſize, a great degree of inflammation and ſwelling took place in the ſac and common integuments, and mortification appeared to be coming on the ſkin. While in this ſtate, no pulſation could be felt in the tumor, or the artery immediately above it: ſo that the ſteps preceding mortification had taken place, which put a ſtop to the dilatation of the ſac, and all its conſequences. From the time the pulſation in the ſac ſtopped, the inflammation and ſwelling ſubſided, although very ſlowly; and as the tumor diminiſhed it became firm and ſolid, and the patient got perfectly well.

" It appears from theſe caſes, that ſurgeons have laid too much ſtreſs upon the ſuppoſed neceſſity of large collateral branches, to inſure the ſucceſs of this operation; an opinion which muſt have ariſen from anatomical knowledge, rather than obſervations made from practice."

Mr. Hunter's ſecond operation upon a trooper about forty years of age, is thus deſcribed:

Case II. " A tourniquet having been looſely applied upon the thigh, the operation was begun by a longitudinal inciſion through the integuments, and the artery and vein were expoſed, as in the former caſe, but not taken up with a number of ligatures, for nothing appeared to have been gained by ſuch practice, and the bad effects of it were obvious in the progreſs of the cure; they were included in one ſtrong ligature, ſufficiently tight to prevent the pulſation in the ſac, without injuring the coats of the veſſels. The ends of the ligature were brought out at the wound, which was in this caſe dreſſed from the bottom. The advantages propoſed by this treatment were, to be able to ſee the progreſs of the cure, and to come readily at the artery, if any unfavourable circumſtance occurred; ſince the abſceſſes in the former caſe were ſuſpected to have ariſen from the mode of healing.

" After the operation, the ſuperficial veins of the leg became exceedingly turgid and numerous, and the limb, although warm, became rather leſs ſo than the other, particularly the foot.

" The next day the leg was ſwelled, and the heat 12° lower than the other; the ſecond day it exceeded the other 5°; and on the fourth day the two limbs were equally warm: the patient was free from fever.

" On the fourteenth day the ligature came away, and the tourniquet was looſely applied, as a precaution againſt bleeding; the ſartorius muſcle was a good deal enlarged, and covered the paſſage down to the artery, ſo as to prevent the matter from having a free diſcharge, a good deal being confined behind it, and with difficulty ſqueezed out at each dreſſing.

" On the nineteenth day there was an hæmorrhage from behind the muſcle, the ſwelling of which rendered it nearly as difficult to come at the veſſel, as if the parts had healed by the firſt intention;

the bleeding was ſtopped by applying preſſure, after having loſt about ten or twelve ounces.

"On the twentieth there was a ſlight bleeding, which was readily ſtopped: yet five hours afterwards the femoral artery gave way, and he loſt about one pound of blood before the tourniquet was applied. The artery was laid bare, and tied a little higher up, the patient being very weak and low; in this ſtate he continued till the twenty-third day without bleeding, when it bled again from a ſmall veſſel. On the twenty-ſixth a conſiderable hæmorrhage having taken place, he became faint, then delirious, had vomiting with hiccough, and died the ſame day.

"Upon examining the limb, ſinuſes were diſcovered both upwards and downwards, in the direction of the artery and ſartorius muſcle, beſides ſmaller ones in different directions.

"In this caſe, the bad conſequences and death of the patient do not appear to have ariſen from the operation, but were entirely the reſult of the mode of treatment afterwards, as will appear from the following caſes."

Case III. Mr. Hunter's third trial was made on a poſtillion, thirty-five years of age. "Compreſſion upon the femoral artery was attempted, but the pain was ſo great that it could not be continued.

"In performing the operation only one ligature was uſed, and the parts healed by the firſt intention.

"On the ſeventh day after the operation, the firſt dreſſings were removed, and a good deal of matter came out by the ſide of the ligature. On the fourteenth the ligature came away, and in four weeks the wound healed.

"The ſac in the ham, from being chafed previous to the operation, burſt at this time, but healed up like any other ſore; and at the end of three months he was perfectly recovered."

Case IV. Mr. Hunter's fourth patient was a coachman, 36 years old.

"The tumor in the ham was not very large, and ſituated lower down than uſual, the whole leg being ſwelled, and the veins turgid. The pain he complained of was exceedingly violent, but being in a very bad ſtate of health, an operation was not thought adviſable, and gentle preſſure on the tumor was attempted; but, from the pain it occaſioned, the operation was had recourſe to, as the only chance of ſaving his life, although, from the irritable ſtate in which he then was, even that ſeemed a forlorn hope.

"In performing the operation, the vein was not included in the ligature; but in other reſpects it was ſimilar to the former.

"Immediately after the operation, the limb was benumbed, and continued ſo for ſome time, which was ſingular, as the nerve had not been included. It became, on the ſame day, four or five degrees hotter than the other leg, and continued ſo for the firſt fourteen days, when the temperature became the ſame as that of the other limb.

"The ſixth day the firſt dreſſings were removed, and the ſkin was united every-where except at the paſſage of the ligature. It remained in this ſtate till the twenty-firſt, when the cicatrix inflamed and ulcerated, with a ſloughy appearance, and hardneſs up the thigh.

"On the twenty-ninth day the ligature came away; the ſore now put on a better appearance, ſuppuration took place where the hardneſs had been in the courſe of the artery, and the parts became ſofter, the diſcharge gradually diminiſhed, and in the ſeventh week the wound was healed.

"But it did not continue ſo; for in three days an inflammation took place, and an abſceſs formed and burſt at the cicatrix, which alſo healed up.

"About the end of the tenth week he was attacked with a very ſevere remitting fever, which laſted fourteen days, and left him much reduced; but in the fourteenth week he was ſo far recovered, as to leave the hoſpital and go into the country, for the recovery of his health."

CASE V. The next upon whom Mr. Hunter performed this operation was Joſeph Caſwell, aged 42, a man not accuſtomed to horſe exerciſe, or any mode of life which could in the leaſt aſſiſt in producing the diſeaſe. The aneuriſm was in the ham of the left leg.

"In performing the operation, the artery alone was included in a ſtrong ſingle ligature, and the wound was healed by the firſt intention, leaving a paſſage for the ligature. The local inflammation was extremely ſmall, and conſequently attended with little ſympathetic fever. The ligature came away the eleventh day, and in five weeks he went into the country, able to walk with a ſtick, the wound perfectly healed.

"In this caſe the heat of the two legs was carefully examined twice a-day, from the ſecond to the ninth after the operation, and the limb operated upon was uniformly colder than the other.

"He came to town ſix months after the operation, and ſaid that the left leg was fully as ſtrong as the right, but, when expoſed to cold, he was more ſenſible of its effects upon that leg. About two months after the operation he had a violent pain in the upper part of the left foot, ſimilar to what is felt when a nerve is preſſed; this laſted for about ſix weeks, and afterwards went entirely off. As no nerve was included in the ligature, this affection probably aroſe from the nerve in its paſſage through the conſolidated parts being deprived of its natural freedom. There was a ſmall tumor, the remains of the aneuriſmal ſac, very diſtinctly to be felt in the ham, but without pulſation, and to the feel perfectly ſolid."

In the hands of others, this mode of treatment has been attended with various circumſtances material to mention. The next caſe was treated by Mr. Lynn, ſurgeon of the Weſtminſter hoſpital. His account of the operation is the following:

Case VI. "Samual Smart, a hackney coachman, 25 years of age, had a popliteal aneuriſm, for which I performed the operation in the following manner. I made an inciſion down to the femoral artery, a little below the middle of the thigh, and having ſeparated the artery from the contiguous parts, I paſſed under it, by means of an eyed probe, a broad ligature, which was tied ſo as to cut off all communication with the tumor, and the lips of the wound were brought together, and retained by ſticking-plaſter, and the patient put to bed; this leg being rather colder than the other, was ordered to be fomented. The next day he was free from pain, and the limb was warmer than the other.

"On the fourth the dreſſings were removed, and the parts were found united, except at the ligature.

"On the thirteenth the ligature came away, and in the courſe of the month the whole was healed, and the patient ſoon afterwards perfectly recovered."

The caſe of aneuriſm next deſcribed is of the femoral artery, by Mr. Birch.

Case VII. "John Lewis, a negro, aged 43, received a blow on the anterior part of the right thigh; about a month after he perceived a ſmall tumor, which gradually increaſed, and his own expreſſion was, that he could feel it thump, thump.

"As the tumor enlarged, he came to London for advice, applied at St. Thomas's hoſpital, on Thurſday, the 26th of October, and was directly admitted. On examination I found a large tumor, extending within two inches of Poupart's ligature upwards, and occupying two-thirds of the thigh; a pulſation could be felt, and there was no doubt of the diſeaſe being an aneuriſm of the femoral artery.

"I directed ſeven ounces of blood to be taken from the arm, and an opiate to be given at night; the patient reſted well, and the next day a conſultation was held, in which it was propoſed to perform an operation, and endeavour to paſs a ligature round the femoral artery, giving the patient the chance of nouriſhing the limb by the arteria profunda, and other anaſtomoſing veſſels.

"On Friday, the 3d of November, it was determined to perform the operation; Mr. Cline undertook to compreſs the artery as it paſſes through Poupart's ligament, which he eaſily effected with a hard compreſs, in the ſhape of a T, with a broad baſis.

"It was agreed, previous to the operation, that an inciſion ſhould be carried in a ſemilunar form round the upper part of the aneuriſmal ſac, in order to make room for the longitudinal inciſion neceſſary to diſſect down to the artery; this was accordingly done, and the integuments raiſed, ſo as to make room to feel for the pulſation of the artery; ſome portion of cellular membrane and lymphatic glands were neceſſarily diſſected and removed: with my fingers I then ſeparated the muſcular fibres, and tore away the connecting parts till the artery could be plainly felt in pulſation; it was then neceſſary to divide a part of the faſcia covering the artery, which was done by carrying the back of the knife on Mr. Cline's nail, while his finger preſſed upon the naked artery; after which the finger and thumb could ſurround and compreſs the veſſel; an eye probe, armed with a ſtrong flat ligature, was then puſhed through the cellular membrane, and carried under the artery. This being effected, we had ſuch command of the veſſel as to be able to ſtrip it down, and paſs another ligature ſomewhat lower. This laſt ligature was then tied, the firſt being left looſe, to ſecure againſt accident.

" The threads being ſeparated and ſecured, the wound was lightly dreſſed, the tumor left in its natural ſituation, and the patient put to bed, with the loſs of only four or five ounces of blood during the operation. No pulſation could be perceived in the tumor after the ligature was tied.

" On Saturday, November the 4th, he had ſlept well, was eaſy, and there was ſufficient warmth in the extremity to aſſure me of ſome circulation. On the 5th the diſcharge from the wounded lymphatics was ſo abundant, as to make it neceſſary to remove the ſuperficial dreſſings; the tumor was rather ſofter to the touch, and the ſkin about the apex of it began to ſhrivel.

" The diſcharge of lymph continued till the 9th, and then the wound began to digeſt, affording, however, a very ſmall quantity of pus. The tumor grew thinner at one point, and ſeemed as if diſpoſed to ulcerate the integuments. This day I paſſed a bleeding ligature round the leg, juſt below the knee, and the veins tumified ſufficiently to have bled freely if they had been punctured.

" 10th. He was feveriſh in the evening.

" 11th. He had ſtools from ſome laxatives I had directed, and was better.

" 12th. The tumor was very thin at one part, and a fluctuation evidently to be felt. The limb was warm and moveable; but the patient was feveriſh, and delirious at night: a decoction of bark, with a ſedative bolus, was directed for him, but he would not take them.

" 13th. The wound looked florid, and afforded good pus; the patient was feveriſh and delirious; the tumor was threatening to burſt. This day he took his medicines.

" 14th. He became ſenſible, but was languid and hot; the tumor burſt, and diſcharged ſerum and grumous blood; he fainted; the dreſſings were not diſturbed; he ſlept compoſedly; fainted again about ſix o'clock in the evening, and expired. I ſaw him at ſeven, when the limb was ſtill warm; I removed the dreſſings, and found a ſmall ſtream of freſh arterial blood which had iſſued from the wound."

Mr. Birch thought it probable that if the patient had applied for relief before the tumor was *ſo much enlarged*, the operation might have ſucceeded, as he could then have tied the ſound artery much lower down. It appeared, when the body was examined, after death, by Mr. Cline, that,

" The integuments on the middle of the tumor were mortified. The blood contained in the tumor was very putrid, and the greater part of it fluid, it appearing to have been diſſolved by putrefaction.

" Water, injected by the external iliac artery, eſcaped freely from the wound at the ligature where the artery was open, and appeared to have ulcerated at that part.

" In laying open the artery from the ligature to the heart, its *internal ſurface appeared of a bright red.* This appearance leſſened at the curvature of the aorta, yet it was very evident in its ſemilunar valves.

" The arteria profunda, which paſſed off from the femoral artery rather leſs than half an inch above the ligature, was alſo inflamed within. There were near two inches of the femoral artery between the ligature and the aneuriſmal ſac, the internal ſurface of which was of the uſual white colour; from this a membranous-like ſubſtance could be peeled off that ſeemed to reſemble coagulable lymph.

" The opening where the artery paſſed out of the aneuriſmal ſac was near three inches below the part where it entered. On opening this part of the artery, from the ſac to the ham, it appeared quite ſound, and of its natural colour."

Mr. Cline, in St. Thomas's hoſpital, performed the operation for the popliteal aneuriſm in the following manner:

CASE VIII. " The patient was a ſailor, who came into St. Thomas's hoſpital to undergo the operation for the popliteal aneuriſm.

" Mr. Cline made a longitudinal inciſion on the anterior part of the thigh, and having laid bare the artery, paſſed, by means of a tin inſtrument, a double tape, about one inch broad, behind the artery, the two pieces of tape lying one over the other. The piece of tin which conducted the tape was cut off, and a cork, nearly an inch long, was laid upon the artery, and confined to its ſituation by means of the upper tape, producing in this way a ſufficient preſſure upon the veſſel, included between the ligature and cork, to ſtop the circulation, and conſequently the pulſation in the tumor in the ham: the other portion of tape was left looſe. The intention of ſecuring the artery in this way, was to compreſs the ſides of the veſſel together, and produce an union without ulceration.

" The patient went on very well; on the ninth day the tapes were removed, and every thing ſeemed to be going on very favourably, when the patient was attacked by a fever (which was ſuppoſed to be caught from another patient in the ſame ward), of which he died.

"Upon examining the ſtate of the limb, after death, it was found that ulceration had taken place through the whole extent of the artery included in the tape; and ſinuſes were formed both upwards and downwards, in the courſe of the thigh, to ſome diſtance."

The laſt caſe related is from a communication of Sir James Earle.

Case IX. "John Smith, about 50 years of age, was received into St. Bartholomew's hoſpital on account of a fever. After having been under the care of the phyſician ſome time, he complained of a ſwelling and pain in his left leg, for which I was deſired to viſit him. He ſaid, about ſix months before, he had fallen from a ſcaffold; that his leg was caught between the rounds of a ladder, which broke his fall; that he felt immediately pain in the upper part of his leg; ſoon after it began to ſwell, and had gradually increaſed to its preſent ſize. On examination there appeared a large hard ſwelling under the heads of the gaſtrocnemii muſcles, reaching up to the bend of the leg. A pulſation was plainly to be felt in it, and there was no doubt of its being an aneuriſm. It was now increaſing very faſt in ſize; the tumor, by its preſſure, cauſed exquiſite pain, all the lower part of the leg was loaded with œdematous ſwelling, and it became abſolutely neceſſary to perform ſome operation to prevent a mortification taking place.

"Having noticed, with much ſatisfaction, the ſucceſs which attended Mr. Hunter's method of tying the artery in the thigh, in a ſimilar caſe, I decided in favour of that operation; but as, in the preſent inſtance, the artery appeared to be in its natural and perfect ſtate in the ham, and in its whole courſe, till it reached the dilatation below the knee, I preferred taking it up in that part, rather than to tie it in the middle of the thigh, under the ſartorius muſcle; though it lies there more ſuperficial, and more eaſily to be got at; becauſe I thought the chance of the circulation being carried on was equal, if not greater, and if it ſhould fail, and ſymptoms ſhould occur to create a ſuſpicion of an impending mortification, there might be an opportunity of removing the limb above the ligature, which would be impracticable if the artery was tied in the middle of the thigh.

"Jan. 28, 1792. The patient being laid on his face, and the tourniquet looſely applied, I made an inciſion about five inches long in the direction of the artery, within thoſe tendons which compoſe the inner ham-ſtring. I then gradually ſeparated the cellular ſubſtance; in doing this the nerve was expoſed, which ran in its uſual courſe, external to the artery, and much more ſuperficial. In finding the artery, ſome difficulty occurred, on account of the tumefaction of all the parts, affected by their vicinity to the aneuryſm, and from the imperceptibility of pulſation in the artery till it was actually laid bare: however, having diſcovered it in its uſual ſituation near the bone, and in its natural undilated ſtate, I paſſed a ligature round it, about two inches above the tumor. I now again examined, and being convinced that the artery was included alone in the ligature, I gradually made it tight, till I felt a pulſation above it, and none below, when I deſiſted, concluding that any preſſure beyond this degree would be uſeleſs and dangerous.

"I will juſt obſerve here, that I found the common aneuriſmal needle with a handle very inconvenient, and would recommend in this caſe, where the artery lies ſo deep, a blunt ſemicircular needle, with the eye about half an inch from the end, without any handle.

"The wound was cloſed in the uſual manner, and the edges brought together by ſutures. On the following day the man was free from pain, the tumor much leſs tenſe or hard, and the whole leg greatly unloaded. No perceptible alteration in the heat of the limb could be remarked; when the current of blood was obſtructed in the ſuperficial veins by preſſure, on its removal they immediately again became turgid; and, in ſhort, every appearance indicated a continuance of perfect circulation.

"On the 15th day ſucceeding the operation the ligature came away, the limb was ſoft and unloaded, and the inciſion nearly healed; at the diſtance of ſix weeks there remains a ſmall tumor, with ſome perceptible fluctuation. The patient cannot perfectly extend his leg, but is able to walk with the aſſiſtance of crutches."

Mr. Home cloſes his remarks with very ſuitable reflections on the foregoing, and ſome other, caſes, which the deſire of brevity has induced us to omit.

"I cannot conclude this paper," ſays he, "without obſerving, that it is ſeldom, in giving an account of a new operation, we are able to collect materials ſufficient to render it ſo ſatisfactory as the preſent, having in our poſſeſſion not only the ſucceſsful and unſucceſsful caſes, but alſo an account of the appearances after death, under both circumſtances; ſo that the cauſes of failure are rendered evident in thoſe inſtances in which it did not ſucceed, and the means that are likely to inſure future ſucceſs are clearly pointed out.

"The operation is in itſelf ſimple; it requires but a ſhort time in the performance, and produces little, if any, affection of the conſtitution; but its advantages are more clearly ſeen by contraſting it with the common mode of operating for the popliteal aneuriſm. This is by expoſing the ſac in the ham through its whole extent, laying it open, ſcooping out the blood, ſearching for the two orifices leading into it, and taking up the artery with a ligature both above and below the ſac. When this operation is over, there remains a large deep-ſeated ſore, compoſed of parts not perfectly in a natural ſtate, and in a moſt diſadvantageous ſituation; which ſore is to ſuppurate, granulate, and heal; a proceſs that is not ſoon erformed, and which muſt leave a ſtiff knee for ſome time afterwards. Yet this is conſidering the operation in the moſt favourable view, ſince there is always a riſk, from the artery being diſeaſed ſo cloſe to the ſac, of the patient dying from a ſecondary bleeding; and when that does not happen, there is ſtill ſome danger of not being able to ſupport the conſtitution during the healing of a large ſore, under circumſtances ſo very unfavourable.

"It is in compariſon with this operation, the only one before in uſe, that the preſent improvement is to be conſidered; and it is in this view that I have thought it deſerving the attention of the ſociety."

In the ſecond volume of the valuable publication from whence Mr. Home's remarks are derived, ſeveral additional facts appear; but for theſe we refer the reader to the work itſelf, from whence, however, we ſelect the following hiſtory of a *ſpontaneous cure of aneuriſm*, by Mr. Wilſon, which we think too extraordinary to be paſſed by.

Case X. "Richard Donavan, 32 years of age (who had for many years followed the laborious occupation of a blackſmith), in the month of October, 1796, perceived that his right leg was conſiderably ſwelled. The ſwelling was conſtantly augmented towards the evening (eſpecially about the ancle), but in the morning when he aroſe was ſcarcely perceptible. He had not laboured under any illneſs before the appearance of the ſwelling, except a ſlight pain in the ſide, which had continued for ſome months, and which, about this time, had entirely left him. This ſwelling of the limb gradually ſubſided, and at the end of two months totally diſappeared. At this time a ſmall circumſcribed tumor took place in the ham, attended with pulſation, a ſlight degree of inflammation, and a great deal of pain, particularly when the limb was in motion. The patient derived conſiderable relief from lying in a horizontal poſture, but he paſſed very reſtleſs nights.

"About a week after the firſt appearance of the tumor, it was of the ſize of a walnut, and in a month as large as a hen's egg. The pain increaſed in proportion, ſo that the limb did not admit of flexion, or of full extenſion, without occaſioning excruciating agony to the patient. In this ſituation he applied to an apothecary, who recommended to him the uſe of a liniment and mercurial friction. But finding that the tumor ſtill increaſed rapidly, he applied to the Weſtminſter diſpenſary for aſſiſtance, and was informed that an early operation was abſolutely neceſſary. From this he was recommended to Mr. Lynn, of the Weſtminſter hoſpital, who corroborated this opinion. At that time the patient ſeemed to conſent, and accordingly agreed to be at the hoſpital on the following day. However, inſtead of coming there, he procured admiſſion into St. Thomas's hoſpital, where he became Mr. Cline's patient. Upon a conſultation, the ſurgeons were all of opinion, that nothing but an operation could ſave the life of the patient. To this, however, the man determined not to ſubmit. He left the hoſpital in a few days, and applied to an empiric, who undertook to cure him in a fortnight. At the end of this time, the ſwelling had become very large, and the pulſation was but little diminiſhed. He then applied to another empiric, who told him (to his extreme diſtreſs) that the tumor was a white ſwelling, and adviſed him to have immediate recourſe to mercurial friction upon the part affected, and to rub a red ointment upon the ſole of the foot. The complaint ſtill continued its progreſs till February, 1797; at which time the tumor was as large as a man's head. The ſkin over the whole extent of the tumor was become greatly inflamed and very tenſe, and the pain almoſt intolerable. The pulſation was now only to be diſcovered by preſſing firmly with the fingers upon the ſuperior part of the tumor. His appetite however ſtill continued good, and his bowels regular.

"At this period, the patient conſulted another ſurgeon, who at once perceived, from the advanced ſtate of the diſeaſe, that nothing could be expected from the operation for the aneuriſm; he therefore adviſed the immediate amputation of the limb; but the patient being willing to procraſtinate the operation, procured admiſſion into St. Bartholomew's hoſpital; his ſtay here, however, was very ſhort; for learning that an operation was propoſed, he went away in leſs than a week after his admiſſion. During his ſtay in the hoſpital, the diſeaſed knee was cupped and ſcarified.

"On the day preceding his departure from the hoſpital, one of his crutches ſlipping, occaſioned him to fall to the ground, by which accident the ſwelled knee was much bruiſed, but there was not at that time any other apparent injury. On the third day from the accident, he perceived (at the ſame inſtant) two diſtinct tumors, each of which was about half an inch in diameter, attended with violent pulſation, and a ſlight degree of pain, ſituated high upon the courſe of the femoral artery of the left thigh; they enlarged very quickly, and the limb upon which they were ſeated was conſiderably benumbed.

"In this condition he was admitted into the Weſtminſter hoſpital, under the care of Mr. Lynn, with no expectation beyond that of rendering the remainder of his life tolerably comfortable, as far as his ſituation would admit of it. The outſide of the thigh and leg, upon which was ſituated the popliteal aneuriſm, was, like the other, much benumbed; and for more than nine weeks there had not been any pulſation in the tumor, which may be attributed to the very numerous layers of coagulated lymph within the aneuriſmal ſac. It was now thought that the pulſation of an aneuriſm of the aorta below the diaphragm could be felt, ſo that as there was a general tendency to this diſeaſe, there was no chance of ſucceſs by operation. Shortly after the patient's admiſſion into the hoſpital, the ſkin of the tumor in the ham became conſiderably inflamed and tenſe, with ſuch excruciating pain, that large doſes of opium were required to allay it. An oozing of bloody ſerum had already taken place from the moſt depending part of the tumor, where the cuticle had burſt; and as every moment ſeemed to threaten the deſtruction of the patient, the tourniquet was conſtantly kept in readineſs for application.

" Such was the patient's miſerable condition, when (having reſided ſeven days at the hoſpital, and finding that no further relief was likely to be obtained) he inſiſted upon being removed to his lodgings, notwithſtanding every argument to point out to him the very great riſk he ran of haſtening his diſſolution. The oozing of ſerum continued for ſome days after his leaving the hoſpital, nor was the pain at all diminiſhed. His appetite remained good, but he was rather coſtive.

" On the 6th of May (being the ninth day from the firſt appearance of the ſerum), when in bed, he had ſuddenly the ſenſation of a fluid running down his leg; upon examination, he perceived that the integuments of the tumor in the ham had given way, and that the blood was ruſhing from the wound in ſuch quantity, that in the ſpace of five minutes, four pounds were loſt. During this time he fainted repeatedly. On the 8th, the wound was become much enlarged, diſcharging large lumps of coagulum occaſionally during fourteen days.

" By this time the knee was nearly reduced to its natural ſize, and the wound diſcharged a thin matter, which was gradually ſucceeded by a diſcharge of pus. When this violent hæmorrhage from the ham had ſubſided, the patient obſerved, that the loweſt of the crural aneuriſms had altogether loſt its pulſation, and was gradually diminiſhing, whilſt that ſituated neareſt to Poupart's ligament was rapidly increaſing, and extremely painful. His appetite was, notwithſtanding, very keen, and his bowels regular. In this ſituation the patient was a ſecond time admitted into the Weſtminſter hoſpital, where (by Mr. Lynn's direction) moderate and uniform preſſure was made by a flannel roller upon the tumors in the thigh; and the wound in the ham was ſuperficially dreſſed. The diſcharge continued very copious for fourteen weeks, and varied in its appearance according to the ſtate of the health of the patient. He was ſupported with cordials and nutritious diet; and at the end of four months from his admiſſion into the hoſpital, the wound was completely cicatrized.

" The ſcar (although the ulcer had been four inches in length, and very deep) was reduced nearly to the narrowneſs of a line.

" In the mean time the aneuriſms upon the thigh (the preſſure having been continued until a ſlight degree of tumefaction had taken place over the limb) had approached ſo nearly to each other, as to form, apparently, one tumor, without any pulſation. In the courſe of two months it was conſiderably ſofter and leſs painful.

"Before the patient quitted the hoſpital (which was on the 10th day of January, 1798) it was ſo very much diminiſhed in ſize, as to be ſcarcely diſcerned when his breeches were on. It was perfectly ſoft, and gave no uneaſineſs. He at this time (February 19th) enjoys a tolerable ſtate of health, having no other complaint than a weakneſs of his lower extremities when he continues long in the erect poſture. The left extremity, upon which were ſeated the crural aneuriſms, is conſiderably leſs than its natural ſize. The other is the moſt ſerviceable limb, although it is ſhorter by two inches; the effect of the miſchief is in the ham."

In No. XXXIV. of the Medical and Phyſical Journal is given the following caſe of an aneuriſm from a puncture of the humoral artery, cured by preſſure above the injury, in a letter from Dr. Adams, of Madeira.

In the beginning of February, 1797, a young baronet, at Madeira, was bled in the median baſilic vein on account of pulmonary complaints threatening conſumption. Conſiderable extravaſation of blood afterwards appeared in the arm, which was imputed to the laxity of the cellular membrane in this ſubject. The orifice was tender, and did not heal readily. In a few days, however, it was thought ſo much better as to render any further attendance unneceſſary, and no miſchief was ſuſpected till the middle of March, when, meeting Dr. Adams at a dinner party, he requeſted to ſee him the following morning.

"I then learned," ſays the doctor, "that the arm had never recovered its original ſize, and that a day or two before a ſmall tumor had ariſen. It was lower in the arm than the cicatrix, and, on preſſure, a very obſcure pulſation might be perceived: it was firmly bound by the faſcia, and not at all diſcoloured or painful. In this ſtage it was not eaſy to diſcover whether an abſceſs was forming, from a ſmall portion of blood remaining unabſorbed and loſing its life; or whether, what was moſt to be dreaded, an artery had been wounded. In the latter caſe there was a fair preſumption, at leaſt, that the wound might be through a vein ſo as to form the varicoſe aneuriſm. At all events, if the caſe was true aneuriſm, there could now be no other remedy but the operation; and as the inciſion had been made ſix weeks, there was too much reaſon to ſuppoſe that the artery muſt be dilated, beyond the orifice. If, therefore, the operation ſhould be performed higher up, according to the improved practice, no inconvenience could ariſe from deferring it for the preſent.

"In this ſituation things remained till the 20th of March, when my patient made a tour of a few days into the country. On his return the tumor ſeemed increaſed; but as that was doubtful, a meaſure of the arm was taken to aſcertain its future progreſs. For a fortnight it remained ſtationary, when it ſuddenly increaſed with the ſame circumſcribed appearance, and an evident ſurrounding diffuſed extravaſation. A ſtrong preſſure was now applied on the upper part of the artery where it riſes ſuperficially. From the lax ſtate of the cellular membrane the veſſel could be ſo preſſed againſt the bone as conſiderably to leſſen its pulſation. In order to protect the circulation in the reſt of the limb, pieces of cane, armed with linen, were placed under different parts of the bandage to keep it hollow. By theſe means there was reaſon to expect that the diameter of the artery might be leſſened, and its collateral branches increaſed, which would very much leſſen the future inconveniences of an operation. Nor was I without hopes, as my patient found no inconvenience from ſtrong preſſure, that it might be gradually increaſed ſo as to obliterate the artery altogether. But either from the difficulty of keeping the bandage fixed, or becauſe the degree of preſſure was unequal to the intended object, in about ten days we had an increaſe of tumor, attended with all the former appearances, and for the firſt time with a ſlight degree of pain.

" It now became neceſſary to take ſome decided ſtep, and as the high operation was in ſome reſpects new, I could not but be anxious to have the aſſiſtance of a ſurgeon who had recently left the buſy ſcenes of improvement and practice. His Majeſty's ſhip the Terpſichore, at that time appearing in our roads, I called the ſurgeon of it, and the only Britiſh phyſician in the iſland, to my aſſiſtance; but had the misfortune to ſtand alone in my propoſal of either performing the operation higher up in the arm, by a ſingle ligature, or trying the effect of preſſure only. Some other difficulties which occurred, determined me to proceed with my patient to the fleet before Cadiz, in order to procure the beſt aſſiſtance circumſtances would permit.

" Finding he had felt ſo little inconvenience from preſſure on a former occaſion, I reſolved to try the uſe of the tourniquet, keeping the fillet hollow by circular pieces of wood under it in different parts. It was hardly credible how little uneaſineſs this was attended with, though the preſſure was ſo conſiderable as almoſt to ſtop all pulſation at the wriſt, and even to occaſion ſome œdema in the hand. This laſt circumſtance made me anxious for ſome apparatus that might preſs more immediately upon the artery, and leave the reſt of the limb as free as poſſible. On enquiry, the ſurgeon of the frigate recollected a ſmall inguinal truſs which was not in uſe.—This was directed to be cut ſomewhat ſhorter, and to be bent to a ſmaller angle. The bulb was fixed about the middle of the humerus, immediately over the artery, which it preſſed ſo cloſe to the bone as to prevent all pulſation in the tumor. My patient, however, felt no uneaſineſs; and though on feeling the hand it was ſenſibly colder than the other, he perceived no numbneſs nor ſenſe of cold. The truſs was fixed on about four in the afternoon, and remained ſo till between nine and ten, when it was the cuſtom of the cabin to retire to reſt. The inſtrument was ſtill left on; but as the arm reſted on the bed on one ſide, and had the preſſure of the clothes on the other, and alſo as there was no longer the roughneſs of the woollen coat to reſiſt the leather, it was not probable the apparatus ſhould long remain ſteady. About midnight I was awakened from my illuſive expectations of ſucceſs to hear my patient, for the firſt time, complain of extreme pain. I found the inſtrument ſo far from preſſing on the artery that it ſeemed ſcarcely to make any preſſure at all. The tumor was ſo perfectly ſolid, that there could be no doubt the blood had coagulated. There was no pain near the part preſſed upon, nor any-where higher in the limb than the aneuriſm, but immediately under and below it. If this aroſe from the preſſure of the ſolid coagulum, which the patient deſcribed as hard as a brickbat, the only remedy appeared by warm fomentations to relax the parts as much as poſſible. Theſe were continued for an hour and a half before the pain entirely ſubſided, though there were frequent intermiſſions. After this the patient reſted till day-light. In the morning he was ſomewhat feveriſh, with occaſional but ſlight returns of pain, chiefly in the fore-arm. The whole arm was thickened from the part to which the preſſure had been applied to the wriſt, and two of the fingers were inſenſible. About nine he aroſe, and during the reſt of the day had frequent returns of what he ſtyled tearing and rending pains in the fore-arm and wriſt. At night an obſcure pulſation was perceived, the aneuriſmal tumor conſiderably increaſed, and the patient complained much of its weight.

"The following morning the tumor remained of the ſame ſize; but the ſkin was florid, tranſparent, and about the centre purpliſh, intermixed with parts of a paler hue. I was now more alarmed than before. The fingers remaining inſenſible, and the pulſe at the wriſt very obſcure, there was reaſon to believe that if the artery had recovered itſelf, it was only as low as the tumor: hence it was impoſſible to calculate what might be the conſequence of the whole force of the heart and arteries urging the blood againſt a part which ſeemed already giving way.

"As, however, preſſure had ſucceeded in obliterating part of the artery, there was every thing to hope from a more regular continuance of it. The thickening of the arm rendered it difficult to fix the truſs in ſuch a manner as to preſs ſufficiently againſt the bone. A part higher up was therefore preferred, not more than two inches from the axilla, the truſs was bent to a ſtill ſmaller angle, and a number of pieces of wood, of a wedge ſhape, were prepared to place under the ſmaller end, in order to increaſe its preſſure *ad libitum.* Under the thick end was placed a ſmall ſquare piece of wood, formed like that of the tourniquet. The ſmaller end preſſing on the artery, a grove was made on the broader and upper part to receive the edge of the truſs. That no time might be loſt, the apparatus was applied as ſoon in the morning as my patient could be placed on the ſofa, with his arm extended on a ſtool.

"After about an hour he complained of intenſe pain between the tumor and the part to which the preſſure was applied. On examination I found, that in ſpite of all my endeavours the artery had recovered itſelf, and this pain ſeemed to ariſe either from the blood again diſtending the contracted part of the artery, or from the veſſel itſelf attempting to dilate, notwithſtanding the reſiſtance of the truſs. This appeared the more certain, becauſe a pulſation, not very obſcure, could be felt below the preſſure; and becauſe, on the application of my finger immediately over the artery, the pain ceaſed. The apparatus was placed on a freſh and thicker wedge at the ſmall end of the truſs; but in the ſpace of half an hour the pain returned, and was eaſily relieved by elevating the narrow end of the truſs ſo as to increaſe the preſſure. As my patient found immediate relief from this, he expreſſed no longer any wiſh to have the truſs removed. For about ſix hours the pain recurred at intervals, though in a ſlighter degree, and was always removed by the ſame means. The laſt paroxyſm was whilſt at dinner. After this he felt ſo great a drowſineſs come over him that it was difficult to keep awake, though he continued to eat. It ſeems at leaſt probable, that the blood ceaſing altogether to flow through the artery, produced, for a ſhort time, a fulneſs in the veſſels about the brain ſufficient to occaſion this heavineſs. In the night he had pains in his hand and fore-arm, but ſlept tolerably well. In the morning the arm appeared thickened from the part preſſed downwards. All the fingers and thumb were inſenſible, though warmer to the feel than thoſe of the other hand, thickened, and of a florid complexion. A pain was felt alternately at the back of the hand, and the inſide of the fore-arm; and the veins of both, whenever the pain occurred, were particularly turgid. Cold ſaturnine applications ſeemed to give ſome relief, but elevating the hand ſtill more.

"The occaſional exacerbations of pain continued without violence, and with leſs frequency, for three days, after which they never returned. There was, however, as the patient expreſſed it, a fidgety kind of a feel about the hand for ſome days after; and it was curious to obſerve, as the thickening of the arm gradually ſubſided, ſo as to expoſe the more ſuperficial veins, how much they were contracted in their diameter.

"I have deſcribed the pain, from the time the artery was cloſed, as ſeated altogether in the veins. It is extremely difficult to reaſon from a ſingle inſtance, but a conſtant attention to every the moſt minute particular, may allow a larger latitude than the common courſe of practice. From this I ſhould not ſcruple to ſay, that the pain aroſe from the valves of the veins being overſtretched by a column of blood falling back ſuddenly upon them. Though it is well known that every part of the vaſcular ſyſtem contracts its diameter in proportion to its contents, yet it is not leſs certain that the veins, beſides that they are more numerous, do not poſſeſs this contractile power equal to the arteries. Hence the ſudden deprivation of ſuch a portion of blood as the humeral artery affords, muſt produce a deficiency firſt in the extreme branches of the veins; in conſequence of which, the valves not being ſupported, a column of blood would be likely to fall ſo ſuddenly upon them as to produce intenſe pain from the novelty and ſuddenneſs of the ſenſation.—That this is really the caſe I had a remarkable illuſtration in an aneuriſm of the temporal artery, which the polite attention of the medical gentlemen of the Engliſh naval hoſpital at Liſbon gave me an opportunity of examining.

"This caſe was of two years' ſtanding; and, from the obſtinacy of the patient, no means had been uſed for his relief. The whole artery was dilated from the temples on each ſide over the cranium. The man was ſubject to violent paroxyſms of pain, which he felt not in the artery, but immediately above the noſe where the veins are ſuperficial. Without, however, inſiſting on this cauſe of the pain, the fact itſelf, ſtrengthened by the obſervations of others, ſhews that there is frequently a kind of ſympathy between arteries and their correſponding veins.

"In the firſt caſe related by Mr. Home of popliteal aneuriſm, the femoral vein was found obliterated. In the ſecond caſe, immediately after the operation, the ſuperficial veins of the leg became turgid. In this operation the vein was included in the ligature, but thoſe remaining were more than ſufficient for whatever blood could be conveyed after the deſtruction of the artery. Morgagni furniſhes inſtances much more ſtriking than theſe: I need only refer you to XL. 23. Thoſe of VIII. 11, and XLIII. 22, may be aſcribed to a gradual enlargement in the artery, which produced a neceſſity of the ſame in the veins. Still, however, the exact correſpondence is worthy remarking. But the moſt ſtriking caſe is that related by Haller, in his Pathological Enquiries, XIX. Here the left carotid artery and jugular vein were both filled with a white, ſoft, and firm ſubſtance. In XX. (note) we are referred to a caſe of aneuriſm of the aorta, in which the vena cava was filled with a fat medullary ſubſtance. Theſe hints are, however, only thrown out for your future obſervation on caſes that are ſo frequently offering themſelves to you.

"That I might as little as poſſible interrupt the hiſtory of the ſymptoms from preſſure, I have taken no notice of the tumor ſince the evening after the firſt application of the truſs. The ſkin grew more tranſparent, and diſcovered under it a blacker appearance. In about two days the cuticle peeled off, and a black coagulum appeared covered with a thin pellicle, either rete mucoſum, or ſtratum of coagulable lymph. The ſmell was that of putrid animal matter.

On the following day a large quantity of ſerum, tinged with red particles, was diſcharged; the coagulum was extremely putrid, and had all the appearance of mortified integuments. I was not, however, at all alarmed at this appearance. It required no ſuperior ſagacity in one who had traced the whole progreſs of the miſchief, to ſee that the coagulated blood which had retained its life, and probably taken veſſels to ſupport that life, as long as it could be uſeful in cloſing the orifice of the artery, had now loſt its life, and being too conſiderable to be abſorbed, was to be thrown out like any other extraneous body. For three days the aperture of the ſkin continued to enlarge, and at the lower edge had a ſloughy appearance. In every other part it was eaſy to ſee that the putrid coagulum was totally diſtinct from the integuments. The appearance was, however, ſo formidable as to alarm the ſurgeon of the frigate; and three days after, when we arrived at the fleet, and the caſe had become ſtill more marked by a hollowneſs, without ſuppuration between the coagulum and integuments, the ſurgeon-general could not be convinced that the whole was not mortification of the original parts.

" The aperture continued to enlarge to a circle, the diameter of which could not be leſs than two inches, after which it became ſtationary. The diſcharge continued of the ſame complexion and quantity for three days; after which it became limpid, but for three days more in as great a quantity as ever. From that time it began to leſſen, the putrid coagulum to be elevated, and gradually thrown out, the œdema in the arm to diſappear, and the orifice to contract. By degrees a redneſs was diſcovered at the bottom which looked like granulation, but was, in fact, only the muſcles expoſed by the removal of the coagulum. During this whole time no applications were uſed but dry lint; the ſore never was painful nor troubleſome after the ſerous diſcharge ceaſed. The fingers remained inſenſible and uſeleſs for ſeveral days; after which the joint neareſt the hand acquired ſome motion; and in about three weeks after the ſucceſsful application of preſſure, all but the thumb and fore-finger had acquired motion. In the mean while the ſuperficial veins began to enlarge; an obſcure pulſation could be perceived at the wriſt, and it was curious to obſerve a circumſcribed line in each of the nails which divide the extreme part of a duſky hue from that nearer the root, which had the ſplendour and ſemi-tranſparency of living nails.

" It was full three weeks more before the fore-finger and thumb recovered themſelves at all; even then the limb was weaker than the other, and colder to the touch. It was, however, equal to all the common purpoſes of life; and when we parted at the Tagus, no difficulty was found in managing a full decanter without the help of the other hand. This was on the 11th of July. By letter of his own writing, dated January, 1798, it appears, that even then the firſt joints of the thumb, fore-finger, and mid-finger, had not acquired their original ſtrength. 'Theſe inconveniences,' he adds, 'are ſo trifling, that I ſhould not have mentioned them had you not deſired me to be very particular.' The ſore had completely cicatrized before the concluſion of the month of July, 1797.

"The caſe above related having riſen from one of the moſt common operations in ſurgery, it is of ſome importance to trace the cauſes that might contribute to it, and alſo the manner of relief. The preſſure of the flannel waiſtcoat, mentioned at the beginning of this paper, probably obſcured the pulſation of the artery ſo as to prevent its being felt before the operation. To the ſame cauſe may be imputed the want of force and of ſaltus in the flow of blood after the inciſion. This is not meant as an apology, but a confeſſion; becauſe, without doubt, every part of the arm ſhould have been examined, and the ſleeve have been opened to prevent any embarraſſment in the operation. I have before remarked, that an old cicatrix was choſen, on which the patient, to uſe his own language, had been bled a hundred times before. This occaſional alteration in the courſe of the veſſels is too well known to require any comment. The attempt to ſtop the blood by preſſure, below the orifice, did not ſucceed: but the uncertain diviſion of the veins at this part often occaſions this difficulty. When the preſſure was applied immediately over the orifice, the bleeding was ſtopped much more eaſily than often happens from venæſection in hot weather. Theſe are the only extenuating circumſtances to be offered for not diſcovering the error at firſt. Had it been otherwiſe, there is no reaſon to doubt but a competent preſſure over the orifice, and above it, might have prevented all the ſubſequent miſchief.

"In the ſecond ſtage of the diſeaſe, ſix weeks after the accident, the artery might as well have been obliterated as at any ſubſequent period, by which means the extravaſated coagulum might have been abſorbed, and the inconveniences of a large ſore avoided. But it will at once occur to the medical reader, that the obliteration of a large artery is not an experiment to be made on conjecture. I have already traced my doubts on that ſubject; and though men, who have ſeen little, and write much, can readily give an unembarraſſed opinion; yet, to me, it is ſufficient that one who knew too well the value of truth to ſport with it (ſee Hunter on the blood, page 196), is not aſhamed of expreſſing his doubts on ecchymoſis."

Dr. Adams offers one important enquiry on this manner of treating aneuriſms. He ſays,

"As the aneuriſm did not ariſe from injury, the ſac was conſequently entire, which is no inconſiderable advantage under ſuch a mode of cure. For if the blood is once coagulated in the ſac, and in the portion of artery below it, the cure muſt follow; becauſe the ſac being impervious can only be diſtended to a certain degree; after which the flow of blood, lower than the ſuperior branches of the artery, would be effectually prevented. Hence we might expect thoſe appearances deſcribed by Mr. Home. ‘ The tumor,’ he obſerves, ‘ increaſed to a conſiderable ſize; a great degree of ſwelling and inflammation took place in the ſac, and common integuments and mortification appeared to be coming on the ſkin.’— While in this ſtate no pulſation could be felt in the tumor, or the artery immediately above it, ſo that the ſteps preceding mortification had taken place, which put a ſtop to the dilatation of the ſac and all its conſequences.

“ Though no one is more ready to admit that harmony of action which Mr. Hunter has ſo beautifully traced in many parts of the economy; yet, in the preſent inſtance, Mr. Home ſeems to me to have preſumed upon it where it cannot be proved, and where it is altogether unneceſſary. To account for the coagulation of blood in arteries above a mortified part, we need only refer to the ſame ſource as Mr. Home quotes. ‘ There is,’ ſays Mr. Hunter, ‘ an important difference between death from mortification, and any other cauſe. A dead man, or a limb cut from a living man, may be injected; but in a mortified part we can neither diſcover blood veſſels, muſcles, nor cellular membrane. The whole has one uniform white leathery appearance.’ It is true the ſame phyſiologiſt obſerves that the coagulation of the blood, in ſome caſes, is ſo much higher than the mortification has extended, that it can only ariſe from a preparatory ſtep to mortification itſelf.’ But it does not appear probable that the diſpoſition to mortification ſhould extend ſo far as to bring the neighbouring veſſels into action, and yet ceaſe without mortification actually following. In the caſe from Mr. Hunter, above referred to, the patient died before the diſeaſe could extend ſo far. We have other inſtances of a preparatory action marking the future progreſs of a diſeaſe; but, I believe, in all ſuch caſes, the diſeaſe itſelf never fails to follow.

“ This has been accurately aſcertained by Mr. Hunter in caſes of morbid poiſon, even when a diſeaſe has been ſuſpended for a time by a remedy; but it may be traced in moſt of the commoneſt operations of diſeaſe and reſtoration. I ſhall inſtance only one. When matter has formed in any part, however diſtant from the ſurface, we are for ſome time in doubt whether it will make its way to the ſkin, or be abſorbed; but from the time that we ſee a florid appearance become permanent on the ſkin, we are ſatisfied that the matter, however diſtant, will make its way outward. If, afterwards, we perceive one part of this reddened ſkin ſomewhat elongated, and paler than the reſt, ſo as to point, as we uſually term it, we are not leſs certain that the matter will find its firſt exit at that place; and however inconvenient ſuch a part may be, no endeavours of the ſurgeon can fruſtrate the intentions of Nature. Should he even make an artificial opening, the part which pointed will ulcerate as deep as the abſceſs, though the contained matter may have been previouſly evacuated.

"From this, and many other inſtances of the kind, it is probable that the diſpoſition to mortification could not have extended ſo far as to bring the neighbouring veſſels into a preparatory action, without mortification itſelf following. It is indeed difficult to conceive how a part highly inflamed can fail to mortify when ſuddenly deprived of all the blood that fed it; for this coagulation muſt have extended to all the minuteſt branches connected with the tumor, or prove unequal to the intention of Nature.

"It ſeems therefore moſt probable that the blood had coagulated in the ſac, and probably in the artery between the ſac and the place of preſſure. In either caſe, the artery would contract itſelf, from the blood no longer paſſing through it, or being much diminiſhed in quantity. But the conſtant efforts of the heart and larger arteries might for an inſtant overcome this preſſure in a variety of ways, in which caſe the blood ſuddenly entering the contracted artery, would produce pain, either from the ſudden change in the ſituation of the artery, from the neighbouring nerve being affected, or from the blood flowing into the now impervious ſac.

"There are many reaſons why the artery above the ſac ſhould recover itſelf, while the ſac remains impervious. The firſt is, that the ſac has loſt its elaſticity. The artery, on the contrary, having contracted upon its contents, is likely to preſerve a ſmall diameter. If this is filled with coagulum and the preſſure is overcome before that coagulum is firm, or has even taken veſſels, the coagulum may readily be forced into the ſac and the blood follow, not only becauſe the diameter of the artery may be increaſed, but becauſe, as in this part the artery ſends off few or no branches, its conical figure is with its apex towards the heart. At the ſame time, the ſituation of the artery below the ſac is very different in this reſpect, and alſo in the obſtruction which the blood muſt meet with in paſſing through the ſac, now ſtuffed with coagulum and deprived of its elaſticity."

Dr. Adams here aſſigns as a reaſon for having dwelt ſo long on this ſubject, his conviction that, in the caſe he has related, the pain during the preſſure aroſe from the artery overcoming that preſſure. He ſays it is obvious that the remedy is to increaſe it; and certainly the ſucceſs he met with juſtifies ſuch a concluſion.

"The advantages an operating ſurgeon may derive," ſays the doctor, "from ſuch a fact appear to me very numerous. In caſes of aneuriſm the whole operation of cutting, ſearching for, and tying the artery, which, how much ſoever ſimplified by Mr. Hunter's important improvement, is by no means trifling, may be ſaved. In caſes of bleeding ſtumps, inſtead of the uncertain proceſs of tying the artery higher, or even renewing the operation, ſuch an application would promiſe every ſucceſs, and be attended with few inconveniences. Since the late improvement in amputation by

Mr. Allanſon, the only thing which prevents an immediate union of the parts compoſing the ſtump is the ligature.

"In warm climates the ligature proves the principal danger, from the frequent recurrence of locked-jaw. To leſſen this danger, and the great pain that attends the common mode of tying the artery, it has been propoſed to diſſect the nerve from it. In the few caſes that I have ſeen, where this has been attempted, it has been a matter of doubt with me whether the pain has been much leſſened. At the ſame time the operation has been prolonged, and I have had reaſon to believe that the artery, thus deprived of the veſſels that ſupported it, has ſloughed ſooner, ſo as to endanger a bleeding ſtump.

"If ſuch a compreſſing inſtrument were applied over the artery of a limb to be amputated, ſome time before the operation, the ſurgeon would have known how far he might depend on its having completely ſtopped the flow of blood, and might perform his operation without embarraſſment to himſelf, almoſt without uneaſineſs to his patient, and with the faireſt proſpect of ſucceſs. For this purpoſe, the ſurgeon, or his aſſiſtant, ſhould remain with the patient, and if neceſſary increaſe the preſſure, till he is ſatisfied there is no longer any danger of the artery recovering itſelf. The inſtrument might be left on after the operation is completed.

"But moſt of all, in thoſe unhappy caſes of hæmorrhage from wounds, where the ſurgeon is abſent, or called to a variety of caſes at the ſame time, how much preferable would ſuch an inſtrument be to the tourniquet? Should the wounded veſſel be deep-ſeated, or the hæmorrhage proceed from a number of wounded ones, how dreadful and often how unſucceſsful does the attempt prove of taking up the artery. All this, however, and much more, will occur to you. Inſtead, therefore, of proceeding any further, I ought to aſk pardon for having detained you ſo long. I cannot however omit one ſmall incident to ſhew ſtill further, how little we need be afraid of the capacity of the veſſels to perform their reſtorative functions, after the obliteration of the large artery. Whilſt the fore-finger was incapable of ſenſe or motion, it was ſcalded with boiling water from a tea-urn. Of this the patient knew nothing but by the evidence of his ſight. Such was the caſe during the veſication, ulceration, and conſequent healing of the part, which took place in as ſhort a time as if the finger had received its uſual portion of blood."

The value and importance of Dr. Adams's ſuggeſtions on a diſeaſe, the treatment of which is yet manifeſtly defective, will bear us out, in the reader's opinion, for having traced the ſubject to ſo great a length in this intereſting communication.

CHAP. XII. OF AFFECTIONS OF THE BRAIN FROM EXTERNAL VIOLENCE.

WHEN the brain is *compreſſed*, a ſet of ſymptoms enſue extremely dangerous, though ſometimes they do not make their appearance till after a conſiderable interval. But at whatever time they appear, they are uniformly of the ſame kind, and are in general as follow: drowſineſs, giddineſs, and ſtupefaction, dimneſs of ſight, dilatation of the pupil; and, where the injury done to the head is great, there is commonly a diſcharge of blood from the eyes, noſe, and ears. Sometimes the fractured bone can be diſcovered through the integuments, at others it cannot. There is an irregular and oppreſſed pulſe, and ſnoring or apoplectic ſtertor in breathing. There is likewiſe nauſea and vomiting, with an involuntary diſcharge of fæces and urine. Among the muſcles of the extremities and other parts there is loſs of voluntary motion, convulſive tremors in ſome parts of the body, and palſy in others, eſpecially in that ſide of the body which is oppoſite to the injured part of the head.

Some of the milder of theſe ſymptoms, as vertigo, ſtupefaction, and a temporary loſs of ſenſibility, are frequently induced by ſlight blows upon the head, but commonly ſoon diſappear, either by reſt alone, or by the means to be afterwards pointed out. But when any other ſymptoms enſue, ſuch as dilatation of the pupils, and eſpecially when much blood is diſcharged from the eyes, noſe, and ears, and there is an involuntary diſcharge of fæces and urine, it may be reaſonably concluded that compreſſion of the brain is induced.

The cavity of the cranium, in the healthy and natural ſtate, is every-where completely filled by the brain; whatever therefore diminiſhes that cavity, will produce a compreſſion of the brain.

The cauſes producing ſuch a diminution may be of various kinds, as, fracture and depreſſion of the bones of the cranium; the forcible introduction of any extraneous body into the cavity of the cranium; effuſion of blood, ſerum, pus, or any other matter; the thickneſs of the bones of the cranium in certain diſeaſes, as in lues venerea, rickets, or ſpina ventoſa; or water collected in hydrocephalous caſes. The firſt ſet of cauſes ſhall be conſidered in their order. The four laſt mentioned belong to the province of the phyſician, and have been conſidered in a former part of this work.

SECT. I. *Of* FRACTURE *and* DEPRESSION *of the* CRANIUM *producing Compreſſion of the Brain.*

FRACTURES of the CRANIUM have been differently diſtinguiſhed by different authors; but it ſeems ſufficient to divide them into thoſe attended with depreſſion, and thoſe which are not ſo.

In fracture and depreſſion of the cranium, the treatment ought to be, 1. To diſcover the ſituation and extent of the fracture. 2. To obviate the effects of the injury done to the brain, by raiſing or removing all the depreſſed parts of the bone. 3. To endeavour to complete the cure by proper dreſſings, and attention to the after-treatment.

When the teguments correſponding to the injury done to the bone are cut or *lacerated*, and, as is ſometimes the caſe, entirely removed, the ſtate of the fracture is immediately diſcovered; but when the integuments of the ſkull remain *entire*, even though the general ſymptoms of fracture be preſent, there is ſometimes much difficulty in aſcertaining it. When, however, any external injury appears, particularly a tumor from a recent contuſion, attended by the ſymptoms already deſcribed, there can be no doubt of the exiſtence of a fracture. But it ſometimes happens that compreſſion exiſts without the ſmalleſt appearance of tumor. In ſuch caſes, the whole head ought to be ſhaved, when an inflammatory ſpot may frequently be obſerved. Sometimes the place of the fracture has been diſcovered by the patient applying the hand frequently on or near ſome particular part of the head.

When the ſymptoms of a compreſſed brain are evidently marked, no time ought to be loſt in ſetting about an examination of the ſtate of the cranium, wherever appearances point out, or even lead us to conjecture, in what part a fracture may be ſituated. For this purpoſe an inciſion is to be made upon the ſpot through the integuments to the ſurface of the bone, which muſt be ſufficiently expoſed to admit of a free examination.

Some authors have recommended a crucial inciſion; others one in form of the letter T; while many adviſe a conſiderable part of the integuments to be entirely removed. But as it is more agreeable to the preſent mode of practice to ſave as much of the ſkin as poſſible, a ſimple inciſion is generally preferred, unleſs the fracture run in different directions, and then the inciſion muſt vary accordingly. It will frequently happen, that a conſiderable part of the integuments muſt be ſeparated from the ſkull, in order to obtain a diſtinct view of the full extent of the fracture; but no part of the integuments is to be entirely removed.

When blood-veſſels of any conſiderable ſize are divided, either before or in time of the examination, they ought to be allowed to bleed freely, as in no caſe whatever is the loſs of blood attended with more advantage than the preſent. When, however, it appears that the patient has loſt a ſufficient quantity, the veſſels ought to be ſecured.

After the integuments have been divided, if the ſkull be found to be fractured and depreſſed, the nature of the caſe is rendered evident; but even where there is no external appearance of fracture, tumor, diſcoloration, or other injury, if the patient continue to labour under ſymptoms of a compreſſed brain, if the pericranium has been ſeparated from the bone, and eſpecially if the bone has loſt its natural appearance, and has acquired a pale white or duſky yellow hue, the trepan ought to be applied without heſitation at the place where theſe appearances mark the principal ſeat of the injury.

Again, although no mark either of fracture or of any diſeaſe underneath ſhould appear on the outer table of the bone, yet there is a poſſibility that the inner table may be fractured and depreſſed. This indeed is not a common occurrence, but it happens probably more frequently than ſurgeons have been aware of; and where it does happen, the injury done to the brain is as great, and attended with as much danger, as where the whole thickneſs of the bone is beat in. The application of the trepan is therefore neceſſary.

But if, after the application of the trepan, it happens that no mark of injury appears either in the outer or inner table in that part, or in the dura mater below it, and that the ſymptoms of a compreſſed brain ſtill continue, a fracture in ſome other part is to be ſuſpected; or that kind of fracture termed by practitioners *counter fiſſure*, where the ſkull is fractured and ſometimes depreſſed on the oppoſite ſide to, or at a diſtance from, the part where the injury was received. This is fortunately not a very frequent occurrence, and has even been doubted by ſome; but different inſtances of it have, beyond all queſtion, been found. If therefore the operation of the trepan has been performed, and no fracture is diſcovered, no extravaſation appears on the ſurface of the brain; and if blood-letting and other means uſually employed do not remove the ſymptoms of compreſſion, the operator is to ſearch for a fracture on ſome other part. The whole head ſhould again be examined with much accuracy; and, by preſſing deliberately but firmly over every part of it, if the ſmalleſt degree of ſenſibility remains, the patient will ſhew ſigns of pain, either by moans or by raiſing his hands, when preſſure is made over the fractured part. In this way fractures have been frequently detected, which might otherwiſe have been concealed.

Having now conſidered every thing preparatory to the operation of the trepan, we ſhall next point out the means beſt adapted for the removal or elevation of a depreſſed portion of the bone.

The firſt thing to be done is, after ſhaving the head, to make an inciſion as deep as the bone, and directly upon the courſe of the fracture.

The patient ought to be laid on a table, with a mattreſs under him, while his head is placed upon a pillow, and ſecured by an aſſiſtant. When the extent of the fracture has been determined, and the bleeding from the inciſion ſtopped, the depreſſed bone is now to be elevated; but previous to this it is neceſſary to ſearch for detached pieces. Should any be found, they ought to be removed by a pair of forceps adapted to this purpoſe. By the ſame inſtrument any ſplinters of bone which may have been beaten in may be removed;

but when a part of the bone is beaten in beyond the level of the reſt of the cranium, as much of the pericranium is then to be removed by a raſpatory, Plate I. fig. 13, as will allow the trephine, fig. 14, to be applied; or, if the operator incline, for the ſake of diſpatch, he may uſe the trepan, which, however, though more expeditious, is much leſs ſafe in the application. The operation indeed may be begun and finiſhed with the trephine, while the trepan may perform the middle and principal part of the work. This part of the work is begun by making a hole with the perforator deep enough to fix the central pin of the trephine, in order to prevent the ſaw from ſlipping out of its central courſe, till it has formed a groove ſufficiently deep to be worked ſteadily in; and then the pin is to be removed. If the bone be thick, the teeth of the ſaw muſt be cleaned now and then by the bruſh (fig. 15) during the perforation, and dipped in oil as often as it is cleaned, which will conſiderably facilitate the motion, and render it more expeditious; making it at the ſame time much leſs diſagreeable to the patient, if he poſſeſs his ſenſes. That no time may be loſt, the operator ought to be provided with two inſtruments of the ſame ſize, or at leaſt to have two heads which can be readily fitted to the ſame handle.

After having made ſome progreſs in the operation, the groove ought to be frequently examined with a tooth-pick, or ſome ſuch inſtrument, in order to diſcover its depth; and if one ſide happen to be deeper than the other, the operator ought to preſs more on that ſide which is ſhalloweſt. Precautions are more particularly neceſſary when the operation is performed upon a part of the ſkull which is of an unequal thickneſs, eſpecially after the inſtrument has paſſed the diploe. And though it be ſaid by writers in general that the inſtrument may be worked boldly till it comes at the diploe (which is generally known by the appearance of blood), yet the operator ſhould be upon his guard in this point, examining from time to time if the piece be looſe, leſt through inadvertency the dura mater be wounded; for in ſome parts of the ſkull there is naturally very little diploe, and in old ſubjects ſcarcely any. It ought likewiſe to be remembered, that the ſkulls of children are very thin. When the piece begins to vacillate, it ought to be ſnapped off with the forceps (fig. 16), or levator (fig. 17); for the ſawing ought by no means to be continued till the bone be cut quite through, otherwiſe the inſtrument may plunge in upon the brain, or at leaſt injure the dura mater. If the inner edge of the perforation be left ragged, it is to be ſmoothed with the lenticular (fig. 18), to prevent it from irritating the dura mater. Particular care is to be taken in uſing the inſtrument, leſt it ſhould preſs too much upon the brain.

The next ſtep is to raiſe the depreſſed part of the bone with the levator, or to extract the fragments of the bone, grumous blood, or any extraneous body. After this, if there appear reaſon to apprehend that blood, lymph, or matter, is contained under the dura mater, it ought to be cautiouſly opened with a lancet, endeavouring to avoid the blood-veſſels running upon it, or lying immediately under it.

When the trepan is to be uſed on account of a fiſſure in which the bone will not yield, the inſtrument ſhould be applied ſo as to include part of it, if not directly over it, as it is moſt probable that the extravaſated fluid will be found directly under it. And when the fiſſure is of great extent, it may be proper to make a perforation at each end, if the whole can be conveniently brought into view: and in ſome caſes ſeveral perforations may become neceſſary.

When it is propoſed to make ſeveral perforations to remove depreſſed fragments of the bone which are firmly fixed, and having the internal ſurface larger than the external, or to raiſe them ſufficiently, it is neceſſary to apply the trepan as near the fractured parts as poſſible; making the perforations join each other, to prevent the trouble of cutting the intermediate ſpaces.

When the ſkull is injured over a ſuture, and it is not thought adviſable to uſe the trepan, a perforation ought to be made on each ſide of the ſuture, eſpecially in young ſubjects, in whom the dura mater adheres more ſtrongly than in adults; becauſe there cannot be a free communication between the one ſide and the other, on account of the attachment of that membrane to the ſuture.

After the elevation of the depreſſed pieces, or the removal of thoſe which are quite looſe, the extraction of extraneous bodies, and the evacuation of extravaſated fluids, &c. the ſore is to be dreſſed in the lighteſt and eaſieſt manner; all that is neceſſary being to apply a pledget of fine ſcraped lint, covered with ſimple ointment, to that part of the dura mater which is laid bare by the trepan, or otherwiſe; after which the edges of the ſcalp are to be brought together, or nearly ſo, and another pledget laid along the whole courſe of the wound; a piece of fine ſoft linen is to be laid over all, and the dreſſings may be retained in their place by a common night-cap applied cloſe to the head, and properly fixed.

The patient may be placed in as eaſy a *poſition* in bed as poſſible, with his head and ſhoulders elevated a little more than ordinary. If the operation be attended with ſucceſs, the patient will ſoon begin to ſhew favourable ſymptoms; he will ſoon ſhew ſigns of increaſing ſenſibility, and the original bad ſymptoms will gradually diſappear. After this he ought to be kept as quiet as poſſible; proper laxatives are to be adminiſtered, and ſuch as may be leaſt of a nauſeating nature. His food ought to be ſimple and eaſy of digeſtion, and his drink of the moſt diluent kind. If he complain of the wound being uneaſy, an emollient poultice ſhould be immediately applied, and renewed three or four times in the twenty-four hours. By theſe means there will commonly be a free ſuppuration from the whole ſurface of the ſore.

Every time the *wound is dreſſed*, the purulent matter ought to be wiped off from it with a fine warm ſponge; and if any degree of ſloughineſs take place on the dura mater or parts adjacent, it will then be completely ſeparated. Granulations will begin to form, which will continue to increaſe till the whole ariſe to a level with the ſurface of the cranium. The edges of the ſore are now to be dreſſed with cerate ſtraps, and the reſt of it covered with fine ſoft lint, kept gently preſſed on it by the night-cap properly tied. In this way the cure will go on favourably; luxuriance of granulations will commonly be prevented; the parts will cicatrize kindly; and as all the ſkin has been preſerved in making the firſt inciſion, the cicatrix will be but little obſerved.

But things do not always proceed in this favourable manner. Sometimes, in a few hours after the operation, the patient is ſeized with a kind of reſtleſſneſs, toſſing his arms, and endeavouring to move himſelf in bed, while the ſymptoms of a compreſſed brain remain nearly the ſame as formerly. In this caſe, eſpecially if the pulſe be quick and ſtrong, the patient ought to be bled freely, as there will be reaſon to ſuſpect ſome tendency to inflammation in the brain. Sometimes, though the trepan has been properly applied, the ſymptoms are not relieved, on account of extravaſated fluids collected internally under the dura mater, or between the pia mater and brain, or in the cavity of the ventricles. The danger in theſe caſes will be in proportion to the depth of the collection. Particular attention therefore ought always to be paid to the ſtate of the dura mater after the perforation has been made. If blood be collected below the dura mater, this membrane will be found tenſe, dark coloured, elaſtic, and even livid: in which caſe, an opening becomes abſolutely neceſſary to diſcharge the extravaſated fluid. Gentle ſcratches are to be made with a ſcalpel, till a probe or directory can be introduced; upon which the membrane is to be ſufficiently divided in a longitudinal, and ſometimes even in a crucial direction, till an outlet to the fluid be given.

After the dura mater has been cut in this manner, there is ſome danger of the brain protruding at the opening; but the danger from this is not equal to the bad effects ariſing from effuſed fluids compreſſing the brain, as we ſhall have occaſion to obſerve by and by. We find that a troubleſome and alarming appearance now and then follows the operation of the trepan; namely, the excreſcences called *fungi*, formerly ſuppoſed to grow immediately from the ſurface of the brain, but which, in general, originate from the ſurface of the dura mater or cut edge of the bone granulating too luxuriantly. We ſhall preſently ſhew that it often happens that they poſſeſs little ſenſibility; and then it has been the practice to prevent their riſing to any great height by touching them frequently with lunar cauſtic. But ſome caſes occur where their ſenſibility is ſo great that they cannot be touched, unleſs they hang by a ſmall neck; and then a ligature may be put round them, and tightened from time to time till they drop off, which will commonly be in the courſe of a few days. It ſeldom happens, however, that there is any occaſion for applying ſuch means for the removal of theſe tumors, for they generally fall off as the perforations of the bone fill up. If they do not, as the connection between them and the brain will be then in a great meaſure intercepted, they may be with more ſafety removed either by exciſion, by cauſtic, or by ligature.

The cure being thus far completed, only a ſmall cicatrix will remain, and in general the parts will be nearly as firm as at firſt, but when much of the integuments have been ſeparated or deſtroyed, as they are never regenerated, the bone will be left covered only by a thin cuticle, with ſome ſmall quantity of cellular ſubſtance. When this is the caſe, the perſon ought to wear a piece of lead or tin, properly fitted and lined with flannel, to protect it from the cold and other external injuries.

This is the method now commonly practiſed in caſes of compreſſion; but it frequently happens, that inſtead of compreſſion, ſuch a degree of concuſſion takes place that no aſſiſtance from the trepan can be attended with any advantage; for the effects of concuſſion are totally different from thoſe of compreſſion, and therefore to be removed in a different manner. Before we proceed, however, upon the latter ſubject, it is incumbent on us to preſent the reader with ſome excellent obſervations on certain points of practice, in caſes of compreſſion of the brain, by Mr. Abernethy. That gentleman, in Part III. of his Surgical and Phyſiological Eſſays, holds out ſome important leſſons to thoſe who have a ſtrong propenſity to employ the trephine upon ſlight grounds. After relating ſix caſes of recovery under circumſtances which would have induced many to reſort to the operation, and which, in his opinion, tend to ſhew, that a ſlight degree of preſſure does not derange the functions of the brain, at leaſt for a *limited time* after its application, Mr. Abernethy ſays,

"The degree of preſſure which the brain can ſuſtain without great injury to the ſyſtem, probably may vary according to the diſpoſition of that organ to be affected by it, the ſuddenneſs of its application, and the direction in which it is made; and although it muſt be very difficult to obtain any preciſe knowledge on this ſubject, yet there is great reaſon to believe that the brain can bear more preſſure without injury to it, than was formerly ſuppoſed. The firſt of theſe circumſtances ſeems evident; for in ſome perſons a ſlight preſſure produces ſevere ſymptoms; whilſt in others a much greater degree is borne without inconvenience. Where a compreſſing cauſe does not, in the firſt inſtance, occaſion bad effects, if inflammation of the brain enſues, it ſeems then to act injuriouſly; which probably ariſes from the increaſed ſuſceptibility of the brain. We can rarely judge of the effects of preſſure when any part of the cranium is beaten in by a blow; for in that caſe the ſhock generally occaſions ſtupefaction. Internal hæmorrhages, perhaps, afford us the beſt criterion whereby to determine the effects of preſſure on the brain. The ſeventh caſe will ſerve as an illuſtration of this remark, where it appears that a conſiderable hæmorrhage muſt have taken place before it deprived the patient of his faculties; for he walked home, undreſſed himſelf, and went to bed, after the trunk of the middle artery of the dura mater had been ruptured. In caſes of apoplexy alſo, the hæmorrhage is generally very large before it produces thoſe conſequences which deſtroy life."

The author mentions a remarkable caſe of recovery from apoplexy, which occurred to Mr. Wilſon's notice.

"A gentleman fell down ſuddenly, and remained for ſome time in that lethargic ſtate which is uſual in apoplectic caſes; but afterwards gradually recovered his faculties both of mind and body, and continued to exerciſe them very perfectly for two years, when a ſecond attack of the ſame kind took place, and deſtroyed him. Upon opening the head, the cauſe of his death became evident; for a large quantity of blood was found in the ventricles, and at the baſis of the cranium. But what ſeemed particularly worthy of attention, was a cavity in the right hemiſphere of the brain, extending from the front to the back part of the cerebrum, being more than four inches in length, and more than an inch in breadth." Within this cavity were contained flakes of coagulated lymph, and a bloody fluid, which were, in all likelihood, the remains of the blood extravaſated at the firſt attack.

"Though a ſlight degree of preſſure," continues Mr. Abernethy, "does not immediately affect the functions of the brain, yet it may act in another way—it may excite inflammation of that organ, as it does of other parts of the body. Its power in this reſpect, however, will probably leſſen by the part becoming accuſtomed to it; and the caſes on record, where fractures with depreſſion have done well, as well as thoſe of recovery from apoplexy, are proofs, that the cauſe which in the firſt inſtance was injurious by its preſſure, may continue to exiſt without inconvenience. Such caſes ought ſurely to deter ſurgeons from elevating the bone in every inſtance of ſlight depreſſion, ſince by the operation they muſt inflict a further injury upon their patients, the conſequences of which it is impoſſible to eſtimate. From all, therefore, that I have learned from books, as well as from the obſervations I have made in practice, and from reaſoning upon the ſubject, I am diſpoſed to join in opinion with thoſe ſurgeons who are againſt trephining in ſlight depreſſions of the ſkull, or ſmall extravaſations on the dura mater. In the latter, it is probable the compreſſing cauſe will ſoon be removed by abſorption; and in the former, according to the obſervations of Mr. Hill, and Mr. Latta, the bone will regain its natural level if the ſubject be young. In adults, however, and eſpecially in perſons of advanced life, this circumſtance cannot be expected; ſo that in them the accommodation of the parts to each other, neceſſary for preventing future miſchief, muſt be effected by a correſponding diminution of the brain.

"A circumſtance, however, frequently occurs, that may render the ſurgeon doubtful as to what courſe he ought to purſue; this happens when, at the ſame time that the ſkull is ſlightly depreſſed, the patient labours under the effects of concuſſion. The circumſtances which generally ſerve to diſtinguiſh thoſe two injuries, will be noticed hereafter. At preſent it is only neceſſary to obſerve, that, as the effects of the latter gradually abate, a little delay will enable the ſurgeon to decide upon the nature of the miſchief, and take his meaſures accordingly. Where the patient retains his faculties, nothing further is neceſſary than a continuance of the antiphlogiſtic plan; and ſhould any diſturbance afterwards take place, the ſame means, employed in a degree proportioned to the urgency of the ſymptoms, will in moſt inſtances be ſucceſsful without elevating the bone."

This happened in four of the ſix caſes which Mr. Abernethy relates without any view to this particular point.

"But if," ſays he, "from a peculiar diſpoſition of the brain to to be affected by preſſure, the diſorder of that organ ſhould increaſe; or if, from inflammation of the brain having taken place, the preſſure ſhould then appear to be particularly injurious, the elevation of the bone ought not, I think, to be deferred. And from ſome of the caſes related by Mr. O'Halloran, in the fourth volume of the Tranſactions of the Royal Iriſh Academy, it appears that this operation, if not too long delayed, will give effectual relief under ſuch circumſtances."

In his ſecond Section, Mr. Abernethy treats of injuries of the head which imperiouſly demand the trephine; namely, thoſe attended with extravaſation of blood upon the dura mater. He relates three caſes in which the ſkull was broken, and depreſſed at the part which covers the *middle artery of the dura mater*, by which means that veſſel was *lacerated*. The attention of ſurgeons, he thinks, has not been ſufficiently directed to this event, although the life of the patient might often be ſaved, if the preciſe nature of the accident were known, and the bone ſpeedily perforated. Theſe caſes, which likewiſe diſplay, in a very ſtriking manner, ſome of the effects cauſed by ſtrong preſſure on the brain, we recommend to the reader's attentive peruſal, regretting that our limits will only admit of our extracting ſome parts of Mr. Abernethy's deductions from them.

Mr. Hill, ſurgeon, in Dumfries, relates a caſe that occurred, in which the artery of the dura mater was ruptured without either fracture or depreſſion of the ſkull; and when he trephined a ſecond time, four days after the accident, he found ſo large a coagulum of blood lying upon that membrane, as to make him afraid of removing it all at once: but on taking out a few ounces of it, the patient, who had hitherto lain in a ſtate of apoplexy, looked up, on being ſpoken to, like one awakened from ſleep, knew, and named every body, and raiſed the arm belonging to the oppoſite ſide, which had been paralytic from the time of the accident.

"Theſe caſes," ſays Mr. Abernethy, "ſhew, that a fracture of the ſkull is not likely to be followed by an equal degree of extravaſation in every part, as the veſſels connecting the dura mater to the cranium are, in moſt parts of that membrane, of a ſmall ſize. If theſe are accidentally ruptured, a ſlight hæmorrhage enſues, which ſoon ſtops, and only a thin ſtratum of coagulated blood is found if the bone be removed. But if the fracture happens in the track of the principal artery of the dura mater; if the trunk, or even a conſiderable branch of that veſſel, be torn, the hæmorrhage will be profuſe, and the operation of the trephine become immediately neceſſary to preſerve the life of the patient. In the three caſes that I have related, the operation was done very ſhortly after the accident: in the firſt caſe, the brain was ſo compreſſed that it did not regain its level; in the ſecond, it roſe ſlowly as the blood found its way through the veſſels; and in the third, it roſe quickly, and the functions of the brain were as quickly reſtored. It can ſcarcely be doubted, then, that if the operation had been performed in theſe caſes as ſoon as it became neceſſary, when, perhaps, only one inſtead of many ounces of blood were poured forth from the torn veſſel, the lives of the patients might have been preſerved.

"It is of great importance to diſtinguiſh accurately the nature of ſuch caſes; and the diſtinction is not difficult when there is an interval of ſenſe between the blow and the ſtupor occaſioned by the effuſed blood. In the firſt related caſe, for inſtance, the nature of the caſe was made ſufficiently evident by this circumſtance. But though we are aſſured that the patient labours under the effects of compreſſion, we cannot, in many inſtances, know the ſituation of the compreſſing cauſe. In other caſes again, where there is no interval of ſenſe after the accident, we are at a loſs to determine whether the ſenſeleſs ſtate be the effect of compreſſion or of concuſſion. Every ſurgeon muſt acknowledge that it would be a very deſirable thing to aſcertain when blood is effuſed between the dura mater and the ſkull; for if the extravaſation has happened in the more interior parts, a ſurgical operation is not likely to afford relief. Now, if the extravaſation which compreſſes the brain be ſituated immediately beneath the bone, I think there are ſigns by which it will be diſcloſed; and as ſufficient notice has not been taken of theſe, I wiſh particularly to call the attention of ſurgeons to them."

"If there be ſo much blood on the dura mater as materially to derange the functions of the brain, the bone, to a certain extent, will no longer receive blood from within; and by the operation performed for its expoſure, the pericranium muſt have been ſeparated from its outſide. I believe that a bone ſo circumſtanced *will not be found to bleed*; and I am certain it cannot with the ſame freedom and celerity as it does when the dura mater remains connected with it internally. I need hardly ſay, that in the caſes which I have related there was not the leaſt hæmorrhage. But it is right to mention, that I have alſo twice been able, by attending to the want of hæmorrhage from the outſide of the cranium, to aſcertain *the extent to which the dura mater was detached within;* and very frequently, when ſymptoms appeared to demand a perforation of the ſkull, I have ſeen it contra-indicated by the hæmorrhage from the bone, and, as the event has proved, rightly.

" When the bone has remained long bare, the caſe may become perplexing. I once ſcraped a portion of the cranium which had been ſome time denuded, and found that it bled in ſuch a manner, as ſufficiently to point out the adheſion of the dura mater, and of courſe the inutility of employing the trephine.

" Where the extravaſation on the dura mater is but ſmall, it will probably not require any operation. A ſlight hæmorrhage from the bone, which may happen from the anaſtomoſing of the veſſels within its ſubſtance, will not, in this caſe, lead to any injurious error. But, from what I have obſerved, I am inclined to believe, that even a ſmall effuſion of blood will diminiſh the hæmorrhage from the ſuperincumbent bone."

Mr. Abernethy, after contending that Mr. Pott's idea, that the bone would periſh when the dura mater was detached for any conſiderable ſpace from its inſide, if not incorrect, ſhould at leaſt be received with ſome qualification, proceeds to enquire into the nature of caſes of *fungus* or *hernia cerebri.*

" Their formation," ſays Mr. Abernethy, " ſeems to proceed from an injury done to a part of the brain by concuſſion or contuſion, which has terminated in a diſeaſed ſtate of the veſſels, ſimilar to what occurs in apoplexy. The morbid ſtate increaſing, one or more veſſels give way, and an effuſion of blood into the ſubſtance of the brain enſues, which, if the ſkull were entire, would probably occaſion apoplexy, but, where there is a deficiency of bone that allows it to expand, preſſes the ſurface of the brain and its meninges through the vacant ſpace. The dura mater ſoon ulcerates, and the tumor puſhing through the openings, now increaſes with a rapidity proportioned to that with which the hæmorrhage takes place within. At laſt, the pia mater, and the ſtratum of the brain which cover the effuſed blood, are ſo extended as to give way, and the blood oozes out and coagulates. Thus the quick growth, and all the other phænomena obſervable in theſe tumors, are ſatisfactorily accounted for.

" It ſeems probable that ſimilar injuries at other times give riſe to the formation of abſceſſes in the ſubſtance of the brain, which are not eaſily aſcertained, and which generally occaſion the death of the patient."

On the *plan of treatment* to be adopted Mr. Abernethy offers a few general remarks. He ſays,

"Where no bad ſymptoms precede the appearance of the tumor, or where they go entirely away upon its being freed from the confinement of the dura mater, it may, perhaps, be moſt prudent not to interfere in the treatment of the complaint: for probably the hæmorrhage will ceaſe, and the coagulum will drop off in pieces, or gradually waſte away, and be no more renewed. All that appears neceſſary, then, under ſuch circumſtances, is to cover the tumor and ſore with ſome mild dreſſing, carefully avoiding all preſſure, which both reaſon and experience ſhew is likely to be attended with bad conſequences. Should the bulk of the tumor, however, become inconvenient, or render preſſure from the dreſſings unavoidable, the practice which preſent experience has ſhewn to be moſt ſucceſsful, conſiſts in occaſionally paring off the tumor with a knife. In this manner Mr. Hill treated ſeveral caſes with ſucceſs.

"But if the tumor continues to increaſe, and if the patient ſuffers a train of bad ſymptoms, apparently ariſing from irritation and preſſure made on the brain, ſome further attempt to relieve him ſeems to be required. Under theſe circumſtances, we have reaſon to ſuſpect that the coagulum, from want of room to protrude, is enlarging internally; or that by plugging up the orifice in the bone, it prevents the eſcape of ſome fluid collected within the cranium. The obvious mode of relief here appears to be, to enlarge the opening in the bone in proportion to the extent and increaſe of the tumor. Many ſurgeons have objected to the removal of much of the cranium, leſt protruſions of this kind ſhould enſue; but it is evident that theſe tumors ariſe from an injury and conſequent diſeaſe of a part of the brain, the event of which muſt be more fatal if the bone was entire. A large removal of bone was formerly a frequent event; but a protruſion of this kind very ſeldom took place.

"But although, by thus allowing a free eſcape to the effuſed blood, we may prevent the injurious effects of its preſſure on the brain, yet the degree of hæmorrhage may endanger the life of the patient.

"The quantity of blood effuſed will depend on the magnitude of the veſſels, or on their diſpoſition to bleed. As the diſeaſe is generally ſituated not far beneath the ſurface of the brain, there is leſs riſque of its proceeding from the former cauſe. If it ariſes from the latter, it is very likely that the diſtenſion cauſed by the confinement of the effuſed blood would irritate the veſſels, and keep up their diſpoſition to hæmorrhage; therefore the treatment already recommended is likely to diminiſh it. But ſhould the quantity of the hæmorrhage ſeem to threaten the life of the patient, I ſhould think it moſt proper to take away the coagulum, and to expoſe the cavity in the brain, in order to learn whether ſuffering ſome ſudden loſs of blood to take place, together with the expoſure of the bleeding veſſels, might not produce a beneficial change, and a ceſſation of the hæmorrhage."

Mr. Abernethy's inducement for propoſing this plan of treatment is, that no other carries with it a probability of ſucceſs. There is an impropriety in attempting to reſtrain the hæmorrhage by preſſure; ligatures cannot be applied, and ſtyptics are known to be dangerous in their effects.

"It is obvious, from the nature of the ſubſtance of which the tumor is compoſed, that ſtyptic remedies applied to its ſurface can have ſcarcely any effect in leſſening its bulk, and none at all in putting a ſtop to its growth; and experience ſhews, that the more active of them are not only ineffectual, but highly dangerous."

Good effects, we underſtand, have reſulted from ſprinkling theſe excreſcences with the following:

(No. 55.) ℞ Myrrhæ in pulv. trit.
Lap. Calaminaris præp. ſing. unc. ſs. Miſce fiat pulvis.

In the caſe of hæmorrhage continuing after the coagulum has been removed, and the veſſels expoſed, Mr. Abernethy ſubmits whether ſome of the vegetable aſtringents diluted, ſuch as infuſion of galls, might not be ſucceſsfully applied to ſtop the bleeding.

SECT. II. *Of* CONCUSSION *of the* BRAIN.

By *concuſſion* of the brain is meant ſuch an injury, from external violence, as either obſtructs or deſtroys its functions, without leaving behind it ſuch marks as to allow its nature to be aſcertained by diſſection.

Moſt of the ſymptoms attending compreſſion of the brain occur alſo in concuſſion; but in a compreſſed ſtate of the brain they are more permanent. There is no diſcharge of blood from the eyes, noſe, or ears, which frequently happens in compreſſion; and inſtead of that apoplectic ſtertor in breathing which accompanies compreſſion, the patient ſeems to be in a ſound and natural ſleep. The pulſe is irregular and ſlow in compreſſion, and grows ſtronger and fuller by blood-letting; but in concuſſion it is weaker, being ſoft and equal, and ſinks by blood-letting. There are beſides convulſions in compreſſions, which are not obſerved in a ſtate of concuſſion. The ſymptoms ariſing from concuſſion come on immediately after the injury is received. In the violent degrees of theſe the patient remains quite inſenſible; the pupils are much dilated, and do not contract though the eyes be expoſed to the ſtrongeſt light.

In more violent accidents, eſpecially when the patient is rendered inſenſible, it is extremely difficult to diſtinguiſh between concuſſion and depreſſion; for ſymptoms which have been ſuppoſed to ariſe entirely from concuſſion, have, after death, been found to be owing to extravaſation or undiſcovered fracture; and extravaſation has been blamed, when, on diſſection, not the leaſt morbid appearance could be diſcovered.

In concuſſion the pulſe will frequently ſink and become feeble, even after the diſcharge of eight or ten ounces of blood. In doubtful caſes, therefore, blood-letting ſhould be practiſed with great caution. If the pulſe become fuller and ſtronger after diſcharging a moderate quantity, if the blood appear ſizy, and eſpecially if the patient become more ſenſible, it may be concluded that the ſymptoms depend upon extravaſation, depreſſion of the ſkull, or ſome degree of inflammation: and as long as advantage ſeems to be derived from blood-letting, we may repeat it: but if, upon drawing a few ounces of blood, the pulſe become feeble, and eſpecially if along with this the patient become more weakly, we ſhould immediately deſiſt from any further evacuation of blood; and in place of it we ought to give ſuch remedies as may ſupport and ſtrengthen the patient: cordials ought to be given internally, and ſtimulants applied externally. Warm wine ſhould be given in proportion to the degree of debility induced; the patient, who is apt, in this caſe, to become cold, ſhould be kept warm by proper coverings; a bliſter ought to be put to all that part of the head in which the ſkin has been injured; ſinapiſms ſhould be applied to the feet; gentle laxatives are uſeful, and ſhould be regularly given, ſo as to keep the body open. If the patient cannot ſwallow wine in ſufficient quantity, volatile alkali, ardent ſpirits, and other cordials of a ſtimulating kind, it is ſaid, ſhould be given; but of this practice we ſhall ſpeak preſently. In concuſſions of the brain, Mr. Bromfield has recommended antimonial opiates, and ſeveral other practitioners agree with him; though ſome conſider opium as hurtful in the early ſtages of the diſorder, and are of opinion that even wine and other cordials ought to be given with ſome degree of caution.

Mr. Bromfield's *anodyne ſudorific* is the following:

(No. 56.) ℞ Tinct. Opii drach. ij.
Vin. Antimon. tartar. drach. vj. Miſce.

The doſe he uſually directed is ten drops every four or ſix hours.

Iſſues, or the frequent repetition of bliſters to the different parts of the head and neck, by which an almoſt conſtant ſtimulus is preſerved, are much recommended. When patients are recovering from accidents of this kind, a liberal uſe of bark, ſteel, and mineral waters, &c. have ſometimes been of ſervice. When the ſtomach is loaded, gentle vomits become neceſſary; and white vitriol is reckoned the beſt in ſuch caſes. When much languor, inactivity, and loſs of memory, continue, electricity long applied has been attended with advantage. This remedy, however, would be hurtful where any ſymptoms of compreſſion or inflammation of the brain are preſent.

On this important ſubject Mr. Abernethy's obſervations cannot be paſſed by. He is of opinion that the effects of concuſſion have not been juſtly deſcribed by authors, nor the ſymptoms related by them thoſe which uſually occur. He therefore ſelects two caſes out of many others, in order to ſhew what really are the common conſequences of this injury named concuſſion. The caſes are theſe:

Case I. " Harriet Silverthorn, aged twenty-three years, ſlipped down ſtairs, and ſtruck her occiput againſt ſome of the lower ſteps, by which the integuments were divided about half an inch in length, but the wound was not deep, nor were the ſurrounding parts much bruiſed. She was taken up ſenſeleſs, was bled, and the next morning conveyed to St. Bartholomew's hoſpital. When brought in ſhe was comatoſe; could not be made to anſwer any queſtions; yet ſhe drew back her arm when pinched, and ſeemed very uneaſy when the wounded parts were preſſed upon. Her breathing was without ſtertor, but performed at ſome interval, as if ſhe did not wiſh to inſpire until obliged by neceſſity. The pulſe, which was full and labouring, intermitted every fourth or fifth ſtroke. Eight ounces of blood were immediately taken away, and an opening medicine given, which procured three ſtools, after which ſhe was ordered a mixture, containing aqua ammoniæ acetatæ, and antimonial wine. The next day *(Friday)* ſhe was rational, put out her tongue when deſired, and ſaid ſhe had no pain in her head; her breathing was more regular, and her pulſe free from intermiſſion. *(Saturday)*, ſhe was ſtill more ſenſible, and gave ſome account of herſelf; complaining now of head-ach, and general uneaſineſs. The mixture was continued, the purging medicine given again, and a bliſter laid on between her ſhoulders. *(Sunday)*, her pulſe was harder; ſhe was ſenſible, but reſtleſs; complained of pain in her forehead, ſat up in bed, and wanted to go home. Six or eight ounces of blood were taken from her temples, and the mixture ordered to be continued as before. *(Monday)*, ſhe was much more compoſed; but as ſhe had ſtill ſome pain in her head, a bliſter was applied to it. *(Tueſday)*, ſhe had ſlept quietly during the night, anſwered rationally, but with quickneſs, and eagerly deſired to go home. As the bliſters appeared to have been ſerviceable, that on her neck was renewed. *(Wedneſday)*, ſhe was perfectly quiet, and in every reſpect better; nor had ſhe, after this, any complaint worth mentioning."

Case II. " A Frenchman, twenty-ſeven years of age, who had been many years in England, and (as it afterwards appeared) ſpoke our language perfectly, had met with ſome accident (but in what manner, I know not), in conſequence of which he was brought to the hoſpital. He was then very comatoſe, and expreſſed much uneaſineſs at being rouſed from that ſtate; yet he put out his tongue when bid, but did not give a rational anſwer to queſtions put to him, and his replies were made in his native language. His pulſe was regular, ſtrong, and about 96 in a minute. Ten ounces of blood were taken from his arm; and after being purged, the common ſaline mixture, with antimonial powder, was ordered to be given. In the night, he grew delirious, got out of bed, and tore the bandage from his arm; in conſequence of which he loſt a good deal of blood before it was perceived. This however ſeemed of uſe to him; for he became more tranquil after it, and lay quietly dozing till morning. Next day, he was more rational, and complained of pain in his head. When I told him that if he kept quiet, he would ſoon be well, he ſaid, he hoped ſo; and appeared ſolicitous to know what ſhould be done to him. His pulſe was only 80, and not ſtrong. A gentle laxative was given, and a bliſter applied to his head.—On the third day, he was much more ſenſible, ſpoke with clearneſs, and mentioned the pain being in the fore-part of his head; yet, when I aſked his age, he told me he was but ſixteen years old. *Tueſday* (fourth day), he appeared more excited and wild; his tongue was dry, but his pulſe only 75. Nine ounces of blood were taken from the temporal artery. Fifth day, his pulſe was only 70, and perfectly natural; yet he had pulled off the dreſſing from his bliſters, and ſeemed to be very irritable. Sixth day, ſtill pain in his forehead, pulſe rather quicker, but tongue not furred. After this, he gradually recovered, without any particular ſymptom occurring, and without any other medical treatment."

Mr. Abernethy conceives that, in neither of theſe caſes, had extravaſation, at leaſt, to any conſiderable degree, taken place within the head, ſince there was no ſtertor, dilatation of the pupils, or inſenſibility. He therefore conſiders them as exhibiting the ſymptoms which attend *ſimple concuſſion*, and reaſons upon them in the following way:

"The whole train of ſymptoms following a concuſſion of the brain," ſays he, "may, I think, be properly divided into three ſtages. The *firſt* is, that ſtate of inſenſibility and derangement of the bodily powers which immediately ſucceed the accident. While it laſts, the patient ſcarcely feels any injury that may be inflicted on him. His breathing is difficult, but, in general, without ſtertor; his pulſe intermitting, and his extremities cold. But ſuch a ſtate cannot laſt long; it goes off gradually, and is ſucceeded by another, which I conſider as the *ſecond* ſtage of concuſſion. In this, the pulſe and reſpiration become better, and though not regularly performed, are ſufficient to maintain life, and to diffuſe warmth over the extreme parts of the body. The feeling of the patient is now ſo far reſtored that he is ſenſible if his ſkin be pinched; but he lies ſtupid, and inattentive to ſlight external impreſſions. As the effects of concuſſion diminiſh, he becomes capable of replying to queſtions put to him in a loud tone of voice, eſpecially when they refer to his chief ſuffering at the time, as pain in the head, &c.; otherwiſe, he anſwers incoherently, and as if his attention was occupied by ſomething elſe. As long as the ſtupor remains, the inflammation of the brain ſeems to be moderate; but as the former abates, the latter ſeldom fails to increaſe; and this conſtitutes the *third* ſtage, which is the moſt important of the ſeries of effects proceeding from concuſſion.

"Theſe ſeveral ſtages vary conſiderably in their degree and duration; but more or leſs of each will be found to take place in every inſtance where the brain has been violently ſhaken. Whether they bear any certain proportion to each other or not, I do not know. Indeed this will depend upon ſuch a variety of circumſtances in the conſtitution, the injury, and the after-treatment, that it muſt be difficult to determine.

"With regard to the *treatment of concuſſion*, it would appear, that in the firſt ſtage very little can be done; and perhaps, what little is done, had better be omitted, as the brain and nerves are probably inſenſible to any ſtimulants that can be employed. From a looſe, and, I think, fallacious analogy between the inſenſibility in fainting, and that which occurs in concuſſion, the more powerful ſtimulants, ſuch as wine, brandy, and volatile alkali, are commonly had recourſe to, as ſoon as the patient can be got to ſwallow. The ſame reaſoning which led to the employment of theſe remedies in the *firſt* ſtage, in order to recal ſenſibility, has given a kind of ſanction to their repetition in the *ſecond*, with a view to continue and increaſe it.

"But here the practice becomes more pernicious, and leſs defenſible. The circumſtance of the brain having ſo far recovered its powers, as to carry on the animal functions in a degree ſufficient to maintain life, is ſurely a ſtrong argument that it will continue to do ſo, without the aid of means which probably tend to exhauſt parts already weakened, by the violent action they induce.

"And it ſeems probable that theſe ſtimulating liquors will aggravate that inflammation which muſt ſooner or later enſue. The acceſs of it, in the caſes which I have related, is ſufficiently evident; and its cure is to be effected by the common methods. The great benefit of *evacuations* was, in thoſe caſes, very evident."

After ſome further remarks in oppoſition to the cordial plan of treatment, and the relation of a fatal caſe of ſimple concuſſion, in which that ſyſtem would have been manifeſtly hurtful, Mr. Abernethy adverts to the very deſirable object of pointing out the marks by which we may diſtinguiſh between compreſſion and concuſſion of the brain; for theſe, he apprehends, may in general be diſtinguiſhed.

"As far as my obſervation goes," ſays he, "the inſenſibility is much leſs in concuſſion, eſpecially after a ſhort time has elapſed. Patients in this caſe, though they ſeem reluctant to anſwer queſtions, yet complain much if their heads are moved; and in thoſe inſtances where it was judged neceſſary to inſpect the bone, I have generally found that they made great complaint during the operation. The pupils alſo are uſually more contracted than in compreſſion of the brain, the muſcles of the limbs retain their natural ſtate of tone, and reſpiration is performed with little or no ſtertor*, though the pulſe generally intermits in a very conſiderable degree. In the ſlighter caſes of concuſſion, the ſickneſs of the patient is often very great.

"But, in caſes of compreſſion of the brain, circumſtances very much the reverſe of thoſe juſt related take place; the ſenſibility is much diminiſhed in proportion to the degree of the injury; from this cauſe alſo the pupils are dilated, and the limbs relaxed; the reſpiration is attended with ſtertor; and the pulſe is ſubject to much leſs intermiſſion."

SECT. III. *Of* INFLAMMATION *of the* MEMBRANES *of the* BRAIN, *or of the Brain itſelf, from external Violence.*

INFLAMMATION of the BRAIN and of its MEMBRANES is attended with ſymptoms which occur in inflammation affecting other parts of the body, and from ſimilar cauſes, and likewiſe with ſymptoms peculiar to the brain itſelf. This diſorder differs eſſentially from concuſſion, in its not appearing immediately; ſeldom till ſeveral days after the accident, and ſometimes not till two, three, or more weeks, or even as many months, have elapſed: when the patient begins to feel an univerſal uneaſineſs over his head, attended with liſtleſſneſs, ſome degree of pain in the part upon which the injury was inflicted, though of this there was perhaps no previous ſenſation. Theſe ſymptoms gradually increaſe; the patient appears dull and ſtupid; there is now a ſenſation of fulneſs, as if the brain were girt or compreſſed; he complains of giddineſs and of nauſea, which ſometimes terminate in vomiting; he is hot, and extremely uneaſy; his ſleep is much diſturbed, neither natural ſleep nor that procured by opiates affording him relief; the pulſe is hard and quick; the face is fluſhed; the eyes inflamed, and unable to bear an expoſure to much light. Sometimes, where a wound of the head accompanies theſe ſymptoms, its edges become hard and ſwelled, and an eryſipelatous inflammation ſpreads quickly over the whole head, and eſpecially towards the forehead and eyelids, which frequently ſwell to ſuch a degree as to ſhut up the eyes entirely. This ſwelling is ſoft and painful to the touch; it receives the impreſſion of the finger, and frequently originates merely from the external wound; on which account the attending ſymptoms are commonly eaſily removed by the means beſt ſuited to eryſipelas of the parts. In a few inſtances, however, this ſymptom is likewiſe connected with, and ſeems to originate from, ſome affection of the dura mater. Its tendency is then of the moſt dangerous kind, and therefore requires the greateſt attention. Soon after, theſe ſymptoms become formidable, the part which received the blow begins to put on a diſeaſed appearance. If the bone has been expoſed by the accident, it now loſes its natural complexion, becomes pale, white, and dry, either over its whole ſurface or in particular ſpots: but when the bone has not been denuded, nor the ſofter parts divided, but merely contuſed, they now ſwell, become puffy, and painful to the touch: and when the head is ſhaved, the ſkin over the part affected is redder than the reſt of the ſcalp; and if the ſwelled part be laid open, the pericranium will probably be found to be detached from the ſkull, and a little bloody fetid ichor will be obſerved between this membrane and the bone, which will be found diſcoloured in nearly the ſame manner as if it had been laid bare from the beginning.

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* The abſence of this ſymptom, however, muſt not be relied on as a proof that there is no compreſſion; for Morgagni relates diſſections of apoplectic perſons, where the effuſion was conſiderable, and yet no ſtertor occurred. Mr. Abernethy ſays, he has himſelf ſeen caſes where it took place only in a very *ſlight degree.*

By the application of proper remedies theſe ſymptoms are frequently entirely removed; but when neglected, or when they do not yield to the means employed, they conſtantly become worſe. Delirium enſues; the patient becomes extremely hot: and is at times ſeized with ſlight ſhiverings, which continue to increaſe, and are attended with ſome degree of coma or ſtupor. The former ſymptoms now, in a great meaſure, diſappear; palſy of one ſide is ſoon followed by deep coma; the pupils are dilated; the urine and fæces are paſſed involuntarily; ſubſultus tendinum and other convulſions enſue; and death certainly follows, if the patient be not ſpeedily relieved.

Of the above ſymptoms, the firſt ſet point out the inflammatory, the other the ſuppurative, ſtage of the diſeaſe. The remedies which are uſeful in the one are highly improper in the other. During the inflammatory ſtage, blood-letting is the principal remedy; but this is improper after the ſuppurative ſymptoms appear, for then the trepan is the only thing that can give relief.

The *indications of cure* are; 1. To employ the moſt effectual means for preventing inflammation. 2. To endeavour to procure the reſolution of inflammation by general and topical remedies. 3. When the inflammation cannot be removed by reſolution, and when ſuppuration has taken place, to give a free vent to the matter. 4. If the affected parts be attacked with gangrene, to endeavour to remove it and obviate its effects.

To anſwer the *firſt* indication, when the contuſion is conſiderable, *blood-letting*, both general and topical, ought to be employed, and to a conſiderable extent; the bowels ought to be kept open by the uſe of laxatives; a watery ſolution of ſaccharum ſaturni ſhould be applied to the part affected, and a low diet, with a total abſtinence from exerciſe, ought to be enjoined: but if theſe means fail, or, as frequently happens, the practitioner has not been called in ſoon enough for their proper application, and if inflammation have actually commenced, the ſecond indication ought then to be attended to. For this purpoſe, blood-letting, not from the feet according to the advice of old practitioners, but as near as poſſible to the part affected, is to be performed, by leeching, cupping, or ſcarifying with a lancet or ſcalpel.

When inſtead of this, general blood-letting is thought more adviſable, it is commonly reckoned beſt to open the external jugular vein, or the temporal artery; and the rule, with regard to the quantity to be evacuated, ought to be, to draw blood as long as the pulſe continues firm; ſo that, in violent caſes, taking away from 20 to 25 ounces at once will be found to anſwer the purpoſe better than to extract even a larger quantity, but at different intervals. A few hours afterwards, if the ſymptoms continue violent, it may be proper to diſcharge an additional quantity; but this muſt depend upon the ſtrength of the patient and the fulneſs of the pulſe.

Along with the liberal uſe of blood-letting, *briſk purgatives* ſhould be given. The bowels ſhould not merely be kept open; but in order to receive full advantage from the practice, a ſmart purging ſhould be kept up by repeated doſes of calomel, jalap, or ſome neutral ſalt. Where the patient cannot ſwallow in ſufficient quantity, ſtimulating injections ſhould be frequently exhibited.

A moiſt ſtate of the ſkin is uſeful in every caſe of inflammation, and ought, therefore, to be here particularly attended to. In general a mild perſpiration may be induced by applying warm fomentations to the feet and legs, and by laying the patient in blankets inſtead of linen. But when theſe means are inſufficient, diaphoretics or even ſudorifics may be given, particularly Mr. Bromfield's (No. 56.)

When much pain or reſtleſſneſs takes place, opiates ſhould be adminiſtered freely, which are now found to be attended with real advantage.

With reſpect to the external treatment of this diſorder, attention ſhould be paid to thoſe means which may moſt readily induce a free diſcharge of purulent matter from the ſeat of the injury. With this view, if the original accident be attended with a wound or diviſion of the integuments, as the lips of the ſore are commonly obſerved to be hard, painful, and dry, it ſhould be covered with pledgets ſpread with an emollient ointment, and warm emollient poultices laid over the whole; by which means, and eſpecially by a frequent renewal of the poultices, a free diſcharge of matter will commonly be induced, and the bad ſymptoms will generally be much mitigated, or entirely removed.

In caſes unattended with a diviſion of the integuments, as ſoon as it is ſuſpected that bad ſymptoms may ſupervene, the tumor ſhould be divided down to the pericranium; and if that membrane be found ſeparated from the bone, it ought likewiſe to be divided; and by inducing a ſuppuration in the way already mentioned, the inflammatory ſymptoms will probably be removed. As matter formed here is commonly of an acrid nature, and therefore apt to affect the bone, and by communication of veſſels the membranes under it, inſtead of waſting time till fluctuation be diſtinctly perceived, a free inciſion ſhould be made as ſoon as a tumor is obſervable. But this would be extremely improper in the treatment of tumors which immediately ſucceed to external injuries; for it often happens that ſuch tumors diſappear ſpontaneouſly, or by the uſe of aſtringent applications. It is only when a tumor attended with pain appears at a diſtant period upon the ſpot where the injury was received, that it ought to be opened as ſoon as perceived.

The next part of the practice regards the remedies to be uſed when the diſorder has either proceeded to ſuppuration, or when, on a removal of a portion of the cranium, the dura mater is obſerved to be ſloughy, with a tendency to gangrene: and this includes the third and fourth indications of cure.

The ſuppurative ſtate of the diſeaſe is known by the inflammatory ſymptoms, inſtead of yielding to the remedies already adviſed, increaſing in violence; and being ſucceeded by coma, dilatation of the pupils, a ſlow and full pulſe, involuntary diſcharge of fæces and urine, palſy, and irregular convulſive motions, and eſpecially when theſe ſymptoms are ſucceeded by fits of rigor and ſhivering.

The exiſtence of matter within the cranium being aſcertained, as no other remedy can be depended upon for removing it, the operation of the trepan ſhould be immediately employed, and as many perforations ought to be made as may be ſufficient for evacuating the matter. But if, after the ſkull is perforated, little or no matter appear between the bone and membranes; if the dura mater ſeem more tenſe than uſual; this membrane is likewiſe to be opened, ſo as to give a free diſcharge to any matter which may be collected between the brain and its membranes.

When it is perceived that the dura mater has already become ſloughy, with ſome tendency to gangrene, the greateſt danger is to be dreaded. If mortification has commenced, there will be much reaſon to think that death will ſoon follow; but different inſtances have occurred of ſloughs forming upon the dura mater, and of cures being made after theſe have ſeparated. All that can be attempted is to keep the ſores clean, to give a free diſcharge to the matter, to apply nothing but light eaſy dreſſings, and to give bark in as great quantities as the ſtomach can bear. If there be ſtill ſome tendency to inflammation, the diet ſhould be low and cooling, the patient ſhould drink freely of whey or other diluent liquors, and the bowels ſhould be kept moderately open: but if, on the contrary, the ſyſtem be low and the pulſe feeble, wine is the moſt effectual cordial.

Mr. Abernethy gives the following caſe, as an inſtance of *inflammation of the pia mater.*

" A man, between thirty and forty years of age, whoſe head had been cruſhed between a cart-wheel and the wall, was admitted into St. Bartholomew's hoſpital, under the care of Mr. Pitts. The integuments of the cranium, and the upper edge of the temporal muſcle, were both torn, and much bruiſed. The patient was ſenſible when received into the houſe. He was immediately bled, and took a purgative medicine. The next day he complained of conſiderable pain in his head; upon which ſaline medicines, with antimony, were preſcribed. On the third day he was worſe; and on the fourth he became delirious and frantic; he frequently endeavoured to get out of bed, and ſtruggled violently when prevented. I now, for the firſt time, ſaw the patient, by the deſire of Mr. Pitts, who was gone out of town. The progreſs and ſymptoms of the complaint clearly ſhewed that it was an active inflammation of the pia mater. The patient was therefore bled largely, and a bliſtering-plaſter applied over the greater part of his head. The next day he was quieter, and more diſpoſed to coma; but when rouſed, he was ſtill irrational and impatient. On the following day (the fifth), the coma had increaſed much; and as the bone was laid bare by the wound, it was thought right to expoſe it more extenſively, in order to ſee if the ſtate of it indicated the propriety of applying the trephine. I accordingly removed a little of the ſloughy temporal muſcle, beneath which I found the pericranium naturally adherent. I alſo ſcraped the denuded bone, and found that it bled freely in every part. This circumſtance contraindicated any operation, and confirmed me in the opinion which I had formed of the diſeaſe, viz. that it conſiſted of active inflammation of the brain, and its membranes. Two days after this the man died. On diſſection, the dura mater was found every-where naturally adherent; the pia mater was much inflamed, and a conſiderable quantity of turbid fluid was collected between theſe two membranes, and alſo in the ventricles of the brain."

Mr. Abernethy obſerves that, in the inſtance juſt given of this very frequent diſeaſe, the *diſtinct interval* which occurred between the immediate effects of the injury and the ſubſequent fatal inflammation, renders the nature of the caſe particularly clear. Yet this does not always happen; and when it is wanting, the inflammation is apt to be confounded with the immediate effects of concuſſion of the brain.

" The inflammation of the *dura mater*," ſays he, " which occaſionally ſucceeds to the injuries of the head, has been well deſcribed by Mr. Pott. Patients labouring under this complaint are feveriſh, have a conſtrictive pain in the head, but continue rational, and give a clear account of their ſymptoms, until matter forms, or inflammation of the internal parts enſues. This is what we might naturally expect from the ſtructure of the dura mater, the manner in which it is ſupplied with blood, and its veſſels having little connection with the brain. When the pia mater becomes inflamed, as the brain derives a conſiderable portion of its blood through the veſſels of that membrane, the diſeaſe is inſtantly communicated to the cerebrum, and deranges its functions. This derangement varies in its nature and degree, according as the inflammation of the pia mater is more or leſs violent; as it is confined to the ſurface, or extends to the internal parts; as it produces a greater or ſmaller ſecretion of fluid which compreſſes the brain; or as it is more or leſs blended with the effects of concuſſion. The ſtate of the patient will vary conſiderably under theſe different circumſtances. If the inflammation be violent and general, the patient will be irrational and diſturbed, having his mind ſtrongly affected by wrong ideas, and endeavouring to act in conſequence of them. If the inflammation be moderate, and affect the ſurface only, he will be irrational, uneaſy, reſtleſs, and perhaps endeavour to get out of bed, but without the violence of mania. Should a moderate inflammation be blended with the effects of concuſſion, he will have leſs appearance of irrationality, will lie pretty quiet, and inattentive to ſlight impreſſions, as appeared in the caſes related.—I am not able to particulariſe every variety that may occur in the ſymptoms; but in all, there muſt be *more or leſs derangement of the powers, both mental and corporeal*, depending upon the degree of inflammation.—The ſymptoms, which chiefly characteriſe the complaint, are thoſe of an increaſe of ſenſibility; the pupils of the eyes are contracted; the patient often withdraws his arm on being touched, and his pulſe and tongue denote general as well as local inflammation. It ſeems of the utmoſt importance, that thoſe means which in general cure inflammation, ſhould be proſecuted very vigorouſly at the commencement of this complaint, ſince otherwiſe, although they may check, they will not overcome it. Large blood-lettings, briſk purging, and extenſive counter-irritation by bliſters, ought to be employed at the very commencement; for, if omitted, then the diſeaſe will become eſtabliſhed, and the powers of the body will ſoon be too much ſunk to admit of the ſame active treatment at a later period."

" In caſes of *tumors* forming within the ſkull," ſays Mr. Abernethy, in concluſion, " it is of conſequence to determine *from what part they proceed.* In general, they will be found to ſpring from the dura mater, and to be the effect of diſeaſe in that membrane, induced and kept up by irritation. Surgeons have endeavoured either to reduce them by cauſtic; to retain them by preſſure; or to take them off by ligature or the knife: and the excreſcences have either ceaſed or continued to grow, according as the irritation which gave riſe to them has been removed or not. If the former happened, the ſurgeon has ſometimes attributed undeſerved merit to the means he had employed for the cure.

" Thoſe tumors which come from *within the dura mater*, may poſſibly differ in their kind in different diſeaſes; but all that I have ever ſeen were of the ſame nature, and thoſe have been deſcribed."

SECT. IV. *Of* FISSURES, *or ſimple* FRACTURES *of the* SKULL.

The term is here meant to imply a mere diviſion of one or both the tables of the ſkull, with or without a wound of the integuments, not attended with depreſſion. Fractures of this kind are not dangerous as far as affects the ſkull only; for it frequently happens that extenſive fiſſures heal without producing bad ſymptoms. But as they are frequently attended with effuſions of blood or ſerum upon the brain or its membranes, or as they may tend to excite inflammation in theſe, they require particular attention.

When effuſions occur, ſymptoms of compreſſion immediately follow. The remedies beſt ſuited to this diſeaſe muſt then be applied; and the trepan is alone to be depended upon. The fiſſures ſhould be traced through their whole extent, and a perforation made on the moſt depending part of each of them. If this be unſucceſsful, the operation ſhould be repeated along the courſe of the fiſſures as long as ſymptoms of a compreſſed brain continue; and as the effuſed matter will commonly be found contiguous to the fiſſures, they ought to be included in each perforation.

If the fiſſure be ſo large as to produce an obvious ſeparation of the two ſides of the bone, the nature of the caſe will be at once rendered evident; but where it is extremely ſmall, there is difficulty in diſtinguiſhing it from the natural ſutures, or from ſutures ſurrounding ſmall bones, which ſometimes occur, and get the name of *oſſa triquetra*. But this may be known by the firm adheſion which always exiſts between the pericranium and ſutures; whereas this membrane is always ſomewhat ſeparated from that part of the bone where a fiſſure is formed. When the pericranium is ſeparated by the accident for a conſiderable way from the ſurface of the bone, various means have been contrived for diſcovering the nature of the caſe; as pouring ink upon the part ſuſpected to be fractured, which in caſe of a fracture cannot be wiped entirely off; or making the patient hold a hair or piece of catgut between his teeth, while the other extremity of it is drawn tenſe, which, when ſtruck, is ſaid to produce a diſagreeable ſenſation in the fractured part. But ſuch teſts are little to be depended on; ink will penetrate the ſutures; and the others are ineffectual, unleſs the fracture be extenſive, and the pieces conſiderably ſeparated from each other. The oozing of the blood from a fiſſure is a better mark. The aſcertaining of this point, however, appears not very material; for unleſs alarming ſymptoms are preſent, although there ſhould be a fiſſure, no operation is neceſſary; and if ſuch ſymptoms occur, the bone ought to be perforated whether there be a fiſſure or not.

When a fiſſure is not attended with ſymptoms of a compreſſed brain, the trepan ought not to be applied, eſpecially as the operation itſelf tends, in ſome degree, to increaſe inflammation of the part. The fiſſure ſhould be treated merely as a cauſe which may induce inflammation. The patient ſhould be blooded according to his ſtrength: the bowels ſhould be kept lax, and the ſore treated with mild, eaſy dreſſing; and violent exertion ſhould be avoided as long as there is any danger of inflammation occurring.

CHAP. XIII. DISEASES OF THE EYES.

Sect. I. *Of the* Ophthalmy *or* Inflammation *of the* Eyes.

Of the general ſubject of ophthalmy, and the numerous ſpecies into which it has been divided by authors, we ſpoke under Medicine, in our firſt volume; we ſhall here reſume the ſubject, as the treatment more properly belongs to Surgery.

Mr. Ware, an excellent writer on the diſeaſes of the eyes, deſcribes the ophthalmy and its cauſes in the following comprehenſive terms:

"The ophthalmy is found in very different degrees. It ſometimes occupies only a part of the globe of the eye; but, in common, it extends itſelf over the whole. It may be ſuperficial, affecting the conjunctiva only; or ſo deep, as to reach the ſclerotica and internal coats. In general, the conjunctiva does not appear to be much thickened: but ſometimes its membranous appearance is entirely deſtroyed, and its projection cauſes the cornea to appear depreſſed and ſunk in the globe. When the ophthalmy is in this ſtate, it is, for the moſt part, accompanied with violent pain; and is deſcribed, in many books, under the name of chemoſis.

"The pain, however, is not always in proportion to the appearance of the ophthalmy. In many caſes, where the inflammation ſeems to be of the ſlighteſt kind, the agony is almoſt inſupportable; eſpecially when the eye is expoſed to the light: and in ſome others, where the inflammation appears to be moſt violent, the uneaſineſs is ſo trifling as ſcarce to be mentioned, though the eye be conſtantly open and uncovered.

"Whatever the degree of inflammation may be, it will, in general, be found that light is offenſive to the eye; and in order to avoid the pain which it occaſions, perſons, who labour under this complaint, are frequently obſerved to keep their eyelids ſhut."

After condemning the practice of binding up the eyelids to obviate theſe inconveniences, and for the purpoſe of applying remedies to them, he recommends the uſe of a paſteboard bonnet, to be worn at a greater or leſs diſtance from the eyes, as the caſe may require.

“ But,” continues he, “ it muſt not be ſuppoſed that the acceſs of light is the only cauſe of pain. Inſtances are common, in which, though the light is excluded, the ſufferings of the patient are continual and exceſſive, from acute pains, which dart through the eye to the back part of the head. This may be the effect of a leſs, as well as greater, degree of inflammation ; and ſuch ſenſations always indicate much danger of the loſs of ſight.

“ In ſome caſes, the patients conſtantly imagine that they ſee black ſpecks, or points, move before the pupil ; which ſymptom is often obſerved to come on, after the more violent ones are abated. Like the former, it is a frequent forerunner of the gutta ſerena ; and is generally accompanied with ſuch a fixed ſtate of the iris, as renders it incapable of contracting or dilating.

“ During the continuance of the inflammation, ſmall *ulcers* are often formed upon the *cornea*, which, being firſt cauſed by it, ſerve afterwards to increaſe it, and render the cure more difficult. Theſe ulcers generally heal in a depreſſion, which is a great impediment to the ſight ; cauſing objects to appear as if they were ſeen through crinkled glaſs.

“ Small *abſceſſes* are alſo ſometimes formed between the laminæ of the cornea ; which, inſtead of diſcharging their contents, harden into white opaque ſpecks, and, according to their ſize, either partially or totally, prevent the entrance of the light. If the ſpecks are ſuperficial, they may wear off in the courſe of time ; but if they penetrate through the whole thickneſs of the cornea, they do not ſeem to admit of any remedy.

“ Theſe abſceſſes ſometimes burſt on the inſide of the cornea, and diſcharge the matter they contain, into the anterior chamber of the aqueous humour, to the bottom of which it deſcends by its own weight ; and here it makes an appearance, like the white ſpeck at the root of the nails, on which account it has been called onyx. The matter, thus produced, is uſually ſmall in quantity ; the ſolid texture of the cornea naturally indiſpoſing it for a large ſuppuration.

“ Nevertheleſs it not unfrequently happens, when there is a long continuance of a violent ophthalmy, that the quantity of matter, formed in the anterior chamber, becomes much more conſiderable, without any perceptible diſorder in the above-mentioned coat of the eye ; and in this larger collected ſtate, it takes the name of hypopion. It is difficult to aſcertain, as well the ſource from which this matter proceeds, as the manner in which it is formed ; and it is, at preſent, needleſs to enquire into either of them, ſince they can determine nothing with regard to the mode of treatment.

“ Matter ſometimes collects alſo in the poſterior chamber of the aqueous humour. It may here either remain in a fluid ſtate, or be inſpiſſated into a ſolid ſubſtance. If it continues fluid, a part of it uſually paſſes through the pupil into the anterior chamber, and falls to the lower margin of the cornea. When it becomes inſpiſſated, it moſt commonly forms adheſions, either to the capſule of the cryſtalline humour, or to the poſterior ſurface of the iris, or to both; and in conſequence of theſe adheſions, the pupil becomes contracted, and its figure is rendered more or leſs irregular, according to the extent of the adheſion. Sometimes the inſpiſſated matter continues looſe, and varies its poſition in the aqueous humour. In this caſe, if it be ſmall in quantity it changes its place, according to the direction in which the head is held; and therefore ſometimes it paſſes through the pupil into the anterior chamber. Sometimes, again, the inſpiſſated matter remains fixed in the poſterior chamber, and there takes the ſhape of a membrane; dividing this chamber into two diſtinct cavities, and anſwering preciſely to the idea entertained by the ancients of the cataract. This membrane often adheres by its circular edge only; the middle part continuing looſe and moveable. In ſuch a caſe, as the adheſion is only partial, the pupil ſtill keeps its figure; and the iris, alſo, preſerves its capacity for motion, though not to the ſame extent as when there is no adheſion. When the pupil contracts, the adventitious membrane has, in ſome inſtances, been obſerved to protrude through it, but to return to its former and common ſituation, when the pupil is dilated."

Of the various *cauſes* that produce the ophthalmy, Mr. Ware ſpeaks in the following terms:

"It frequently," ſays he, "comes on in the moſt ſudden and unexpected manner, without any preceding or concomitant illneſs. When it happens in this way, the common people call it a *blaſt* in the eyes: and, indeed, it ſeems to proceed from ſome peculiar property in the air, which ſurrounds us. Like other epidemical diſeaſes, it often affects a whole neighbourhood at the ſame time: as was the caſe during the ſummer 1778, at Newbury in Berkſhire, and in ſeveral of the camps, where it was known by the name of the *ocular diſeaſe*.

"*Blows* on the eye, according to the force with which they are given, may bring on very different degrees of inflammation. If ſlight, the effects are, moſt commonly of ſhort duration; but if violent, a confuſion in the coats and humours often takes place, and, in conſequence of it, a blindneſs which appears to be incurable.

"*Wounds* and *punctures* are attended with conſequences equally pernicious. Swords, knives, and ſuch-like inſtruments, generally enter between the globe and orbit, pierce the conjunctiva, wound the cellular membrane that ſuſtains the eye, and if continued onward, penetrate into the brain itſelf. Wounds thus occaſioned produce the moſt dreadful head-achs, inflammations, abſceſſes, and ſometimes immediate death: but if the miſchief is done with needles, pins, or ſharp-pointed inſtruments like them, they are more apt to pierce the globe itſelf. Hence it often happens, that ſuch punctures are followed with the immediate and total loſs of ſight.

"It is not unuſual for *blows* on the eye, as well as punctures and ſmall wounds, to produce an extravaſation of blood under the tunica conjunctiva. The quantity of blood thus extravaſated is ſometimes ſo conſiderable as to elevate the conjunctiva above the level of the cornea, in the ſame manner as in the chemoſis; and at other times the quantity is ſo ſmall, as to be no otherwiſe viſible, that by a little redneſs round the veſſel from which it iſſued. It is here to be noticed, that the appearance of the extravaſated blood, though at firſt red, after a few days, turns dark and livid."

Mr. Ware adds, that extravaſations of this kind may alſo take place without any external accident; eſpecially in perſons of a plethoric habit, and when the weather is hot. "Theſe," he ſays, "are probably owing to a debility in the veſſels of the conjunctiva, which renders them unable to reſiſt the impetus of the rarefied blood. Theſe extravaſations, however, never occaſion pain, nor any material obſtruction to the ſight.

"*Foreign bodies* entangled in the eye are another common cauſe of inflammation. Theſe, during their continuance, occaſion great pain and an inability to move the lids. They alſo excite an additional ſecretion of tears; the flow of which is, in general, ſufficient to remove them: but if that fails, the lids muſt be held open by the fingers, and the patient deſired to look towards the ſide, which is oppoſite to that wherein the extraneous ſubſtance lies; when, if ſmall, it may be wiped off with wet lint on the point of a probe. If there is reaſon to ſuppoſe that more particles than one are in the eye, it may be neceſſary to ſend a ſtream of water over it, by means of a ſyringe; or to fix an eye-cup on the lids, filled with water, or ſome other mild liquor. The cup being ſhaped exactly to the part, will permit the lids to be opened or ſhut at pleaſure, whilſt the eye is immerſed in the fluid which the cup contains.

"If there be an adheſion of the extraneous body to the cornea, and that ſo ſtrong as to reſiſt theſe attempts to remove it, authors recommend that it be ſeparated with the point of a lancet; which, no doubt, if due care be taken, may be done with perfect ſafety; but, previous to this, it cannot but be adviſable to make uſe of a thin blunt-pointed ſcoop, ſomething larger than a common probe; which has this advantage over the lancet, that it will not wound the cornea, and conſequently will leave no ſcar, that might be afterwards an impediment to the ſight."

Where ſmall extraneous particles have inſinuated themſelves under the upper lid, and adhere to it ſo cloſely that none of the means above mentioned will remove them, Mr. Ware directs us to turn the inſide of the lid outward by the preſſure of the fore-finger and thumb of one hand, applied to the lower edge of the affected lid, whilſt a ſmall preſſure is at the ſame time made by a probe held in the other hand, on the outſide of the lid, a little above the upper margin. The foreign particle may then be removed by a little wet lint fixed on the point of a probe.

Small pieces of iron, projected forcibly againſt the eye, very often ſtick in the tunica conjunctiva. Theſe may ſometimes be very conveniently removed by a load-ſtone. After continuing there for ſeveral days, Mr. Ware has ſeen a ſuppuration take place around them, and this has ſeparated their attachment, and cauſed them to drop out of their own accord. "But, in general," ſays he, "it muſt be very unſafe to truſt to the operation of nature in ſuch caſes; for the continuance of theſe, or of any ſubſtance, in the eye, even for a ſhort time, is likely to bring on inflammations of the moſt violent and injurious nature."

Mr. Ware enumerates, among the cauſes of ophthalmia, the ſmall-pox and meaſles, the venereal diſeaſe, and laſtly, the *trichiaſis*, or inverſion of the edges of the eyelids.

The great objects to be aimed at, in the treatment of ophthalmia, are, in the firſt place, the reſolution of the inflammation which has already taken place; and ſecondly, the removal of thoſe conſequences which frequently ariſe from the inflammation, eſpecially if it have been of long ſtanding. But beſides theſe, while it has appeared, from former obſervation, that there is a peculiar diſpoſition to the diſeaſe, means may often be ſucceſsfully employed to combat this diſpoſition, and thus prevent the return of the affection.

The ophthalmia membranarum requires the remedies proper for inflammation in general; and when the deeper-ſeated membranes are affected, and eſpecially when a pyrexia is preſent, large general bleedings may be neceſſary. But this laſt is ſeldom the caſe; and, for the moſt part, the ophthalmia is an affection merely local, accompanied with little or no pyrexia. General bleedings therefore have little effect upon it; and the cure is chiefly to be obtained by topical bleedings, that is, blood drawn from the veſſels near the inflamed part. For this purpoſe Mr. Ware is in the practice of opening the angular vein lying contiguous to the inner canthus; but opening the jugular vein, or the temporary artery, may be conſidered as in ſome meaſure of this kind. Indeed it is commonly ſufficient to apply a number of leeches near the eye; but it is perhaps ſtill better to draw blood by cupping and ſcarifying upon the temples. In many caſes, the moſt effectual remedy is to ſcarify the internal ſurface of the inferior eye-lid, and to cut the turgid veſſels upon the adnata itſelf; which Mr. Ware alſo recommends.

Beſides blood-letting, purging, as a remedy ſuited to inflammation in general, has been conſidered as peculiarly adapted to inflammation in any part of the head, and therefore to ophthalmia; and it is ſometimes uſeful: but, for the reaſons given before with reſpect to general bleeding, purging, in the caſe of ophthalmia, does not prove uſeful in any proportion to the evacuation excited. For relaxing the ſpaſm in the part, and taking off the determination of the fluids to it, bliſtering near the part has commonly been found uſeful. When the inflammation does not yield to the application of bliſters after topical bleeding, great benefit is often obtained by ſupporting a diſcharge from the bliſtered part, under the form of an iſſue, by which means a more permanent determination of blood to that part is obtained.

It is probably alſo on the ſame principle that the good effects obtained from the uſe of errhine medicines in obſtinate caſes of ophthalmia are to be accounted for. By theſe errhines, in particular, which occaſion and ſupport for ſome time a great diſcharge from the noſe, great benefit has often been obtained. The powder of aſarabacca, or the infuſion of hippocaſtanum, ſnuffed up the noſe at bed-time in proper doſes, are often productive of the beſt effects, when many other remedies have been tried in vain. Mr. Ware has found the following of uſe in common caſes, and in the gutta ſerena:

(No. 57.) ℞ Hydrargyri vitriolati gran. j.
Pulveris glycyrrhizæ gran. viij. Miſce.

He directs one-fourth of this quantity to be ſnuffed up the noſtrils once or twice a-day.

Ophthalmia, as an external inflammation, admits of topical applications. All thoſe, however, which increaſe the heat and relax the veſſels of the part, prove hurtful; and the admiſſion of cool air to the eye, and the application of cooling and aſtringent medicines, which at the ſame time do not produce irritation, prove uſeful. In the cure of this diſeaſe, indeed, all irritation muſt be carefully avoided, particularly that of light; and the only certain means of doing this is by keeping the patient in a very dark chamber; or at leaſt directing him to wear a ſhade of green ſilk over the eyebrows, as we have already ſaid is a practice adviſed by Mr. Ware.

The following collyria from the Pharmacopœia Chirurgica, afford a ſufficient variety for the choice of the practitioner in the treatment of this diſeaſe:

(No. 58.) ℞ Calomel. ſcrup. j.
Aquæ roſæ unc. j. Miſce.

A drop or two of this conveyed into the corner of the eye with a camels'-hair pencil (after ſhaking the vial) has an excellent effect in cooling inflamed eyes, when there is a ſenſe of heat and dryneſs in them. But whilſt this is *occaſionally* done, the edges of the eyelid ſhould be lightly bruſhed over with a pencil ſmeared with ung. hydrarg. nitrat. and a drop of thebaic tincture alſo conveyed into the eye, after the manner practiſed by Mr. Ware, at leaſt once a-day. The ſame ſhould be done even under the uſe of other collyria.

(No. 59.) ℞ Aquæ ammoniæ acetatæ.
Aquæ roſæ ſing. unc. j. Miſce.

This is a moſt uſeful application to inflamed eyes, where there is a high degree of irritation and pain, and will often ſucceed when other collyria have been ineffectually tried.

In this, as in the application of all fluid remedies to the eye, it is of importance to bring them into *contact* with the part, and even to ſuffer them to paſs between the eye-lids. They are therefore moſt effectually applied with the aſſiſtance of that uſeful veſſel called an *eye-cup*; or, where the more permanent application of the remedy is requiſite, ſingle bits of fine linen rag may be dipped into the liquid and laid one over another; the outer pieces being occaſionally taken off and dipped afreſh as the fluid evaporates.

In ſome caſes, the aqua ammoniæ acetatæ may be uſed undiluted.

(No. 60.) ℞ Aquæ diſtillatæ unc. iv.
Aquæ lithargyri acetati gutt. x. Miſce.

(No. 61.) ℞ Spiritus camphorati gutt. xx.
Aquæ lithargyri acetati gutt. x.
Aquæ diſtillatæ unc. iv. Miſce.

It is neceſſary to remark, that theſe ingredients are to be put together in the order here ſet down, otherwiſe the camphor will be ſeparated.

(No. 62.) ℞ Collyrii ammoniæ acetatæ. (No. 59.)
Miſturæ camphoratæ ſing. unc. ij. Miſce.

(No. 63.) ℞ Collyrii ammoniæ acetatæ unc. iv.
Pulveris ceruſſæ compoſiti drach. j. Miſce.

(No. 64.) ℞ Hydrargyri muriati gran. j.
Aquæ diſtillatæ unc. iv. Miſce.

(No. 65.) ℞ Pulveris ceruſſæ compoſiti drach. j.
Aquæ roſæ unc. iv. Miſce.

The next is in uſe at Guy's hoſpital:

(No. 66.) ℞ Zinci vitriolati gran. v. ad x.
Aquæ diſtillatæ unc. iv. Miſce.

This is one of the formulæ of St. Bartholomew's hoſpital:

(No. 67.) ℞ Zinci vitriolati drach. ſs.
Camphoræ gran. vj.
Pulveris radicis iridis gran. x.
Aquæ roſæ unc. vj.

This is one of the formulæ of the Hoſpital of Invalids at Paris. The three firſt ingredients are directed to be beaten in a mortar with the white of a hard-boiled egg, but for what purpoſe it is not eaſy to underſtand, as the roſe-water is afterwards to be added, and the clear liquor ſtrained off.

The following, from St. Bartholomew's, is perhaps equally good, though much leſs complex in the preparation:

(No. 68.) ℞ Zinci vitriolati drach. ſs.
Camphoræ gran. x.
Aquæ ferventis unc. vj.

The vitriolated zinc being rubbed with the camphor and the boiling water poured on, the clear liquor is to be ſeparated by filtration.

There are few better collyria than theſe in which vitriolated zinc forms an ingredient.

(No. 69.) ℞ Aluminis purificati ſcrup. j.
Aquæ roſæ unc. vj.

The alum being diſſolved in the roſe-water makes a good aſtringent collyrium. It is in uſe at Guy's hoſpital.

(No. 70.) ℞ Cupri vitriolati gr. j.
Aquæ diſtillatæ unc. iv. Miſce.

This reſembles the aqua cupri ammoniati in its qualities, and may be weakened or ſtrengthened at pleaſure by varying the proportion of vitriolated copper.

(No. 71.) ℞ Collyrii ammoniæ acetatæ (No. 59.) unc. iv.
Tincturæ opii gutt. xl. Miſce.

This is moſt ſuitable in an inflamed ſtate of the eye, when the pain is conſiderable.

(No. 72.) ℞ Opii in pulverem triti gr. j.
Camphoræ gr. ij.
Aquæ ferventis unc. iv.

The opium and camphor are to be rubbed together, the hot water then added, and the liquor laſtly ſtrained through a fine cloth.

This collyrium has very ſoothing properties, and is ſuited to thoſe caſes of ophthalmia in which there is a peculiar degree of irritability.

Among other remedies, as well for this as for inflammation more immediately affecting the eyelid, Mr. Ware's practice of conveying, once a-day, into the eye, a drop or two of tincture of opium, prepared as directed in the old Diſpenſatory, is not to be forgotten. This, indeed, is of the greateſt ſervice, and ſometimes gives immediate relief, after various collyria have been tried in vain. For this reaſon we ſhall here give Mr. Ware's account of this valuable remedy in his own words:

" Beſides *bleeding* and *bliſtering*," ſays he, " ſome local applications are neceſſary. I would particularly recommend the thebaic tincture of the old London Diſpenſatory; a medicine compoſed of opium and warm aromatics, diſſolved in mountain wine. The power of opium, when inwardly taken, to eaſe pain and induce ſleep, has been long known: but its external uſe is abſolutely forbidden by ſome very reſpectable perſons of the medical profeſſion. Galen relates, that a gladiator was killed by a plaſter of opium applied to the head: and other authors have ſaid, that blindneſs and deafneſs were cauſed by its application to the eyes and ears. Experience, however, makes directly againſt theſe aſſertions; and proves, beyond contradiction, the great efficacy of its outward uſe in a variety of caſes. In the ophthalmia, particularly, I have found the thebaic tincture, wherein opium is the principal ingredient, to be eminently ſerviceable: and the mode in which I applied it, has been to drop one drop of it into the eye, once or twice a-day, according as the ſymptoms were more or leſs violent. When firſt applied, it cauſes a ſharp pain, accompanied with a copious flow of tears;

which continues a few minutes and gradually abates; after which, a greater and remarkable degree of eaſe generally ſucceeds.

"The inflammation is often viſibly abated by only *one application of this tincture*; and many bad caſes have been completely cured by it in leſs than a fortnight, after every other kind of remedy had been uſed for weeks, and ſometimes months, without any ſucceſs. But this ſpeedy good effect is not to be expected in all caſes indiſcriminately. In ſome, the amendment is more ſlow and gradual, requiring the tincture to be made uſe of for a much longer time; and a few inſtances have occurred, in which no relief at all was obtained from its firſt application. In caſes of the latter kind, in which the complaint is generally recent, the eyes appear ſhining and gloſſy, and feel exquiſite pain from the rays of light. However, notwithſtanding theſe ſymptoms, the application is ſometimes found to ſucceed; and whether it will or not, can only be determined by making the trial; which is attended with no other inconvenience than the momentary pain it gives. When it is found to produce no good effect, the uſe of it muſt be ſuſpended, until evacuations, and other proper means, have diminiſhed the exceſſive irritation; after which, it may again be applied, and bids equally fair for ſucceſs, as in thoſe inſtances in which it never diſagreed."

Here the author obſerves, by the way, that if two or three drops of the thebaic tincture are dropped at once on the globe of the eye, the pain they occaſion will be conſiderably greater than if they are placed *in the inner angle of the eye-lid* and made to glide gradually on the eye, by gently drawing down the lower lid. At the ſame time that this latter mode of applying the tincture is much leſs painful than the former, he tells us he has found it equally beneficial.

"Though I have ſaid," continues Mr. Ware, "that opium is the baſis of the thebaic tincture, it is yet neceſſary to obſerve, that the manner in which it is here prepared is that on which its efficacy not a little depends. I have ſeveral times applied a ſtrong ſolution of opium in water without any ſucceſs. The pain, indeed, was ſometimes leſſened for a while, but the inflammation always remained in its full force, as if nothing had been done. A fomentation made with poppy-heads, and applied warm, has been found comfortable to the diſeaſed part; and, in ſlight attacks of this diſorder, has been ſufficient to remove it: but, in more obſtinate caſes, it has repeatedly been found ineffectual, until the tincture itſelf was uſed.

"That I might judge ſtill more certainly what it was in the thebaic tincture which chiefly cauſed its utility, I have alſo occaſionally made the experiment of the ſole application of the other principal ingredient, which is mountain wine. But this I found, while it produced a ſtill ſtronger irritation in the eye, and of much longer continuance than the tincture, was ſeldom followed with any kind of benefit.

"Having thus ſatisfied myſelf, that neither of the ingredients, in their ſeparate ſtate, was able to give the relief which they did when combined in the tincture, I have for a long time paſt confined myſelf almoſt wholly to the uſe of the latter; and I am warranted, from repeated experience, to recommend it, with the helps and cautions above given, as a moſt effectual application in every ſpecies and ſtage of the diſorder, from the moſt mild and recent, to the moſt obſtinate and inveterate."

Mr. Ware remarks, however, that "when the ophthalmia is accompanied with a violent pain in the head, as well as in the eye, a ſtrong decoction of poppy-heads, applied as a fomentation, has ſometimes been joined, with great advantage, to the uſe of the thebaic tincture, and of the other remedies that are above recommended. If the habit be much relaxed, a fourth part, a third, or even a half, of brandy, or of ſpirit of wine, may be added to the fomentation; and after the pain is ſomewhat abated, compreſſes, wet with a mixture of equal parts of brandy, verjuice, and water, and ſometimes of brandy alone, bound on the eyes during the night, have produced very eſſential ſervice."

2. In the *ophthalmia tarſi*, the ſame medicines may be neceſſary as have been already recommended for the ophthalmia membranarum. However, as the ophthalmia tarſi may often depend upon an acrimony depoſited in the ſebaceous glands of the part, ſo it may require various internal remedies according to the variety of the acrimony in fault: for this we muſt refer to the conſideration of ſcrophula, ſyphilis, or other diſeaſes with which the ophthalmia may be connected; and where theſe ſhall not be evident, certain remedies more generally adapted to the correction of acrimony, ſuch as mercury, may be employed. In the ophthalmia tarſi, it almoſt conſtantly happens that ſome ulcerations are formed on the tarſus. Theſe require the application of ung. hydrarg. nitrat. which alone may ſometimes cure the whole affection; and the ſame may be uſeful even when the diſeaſe depends upon a fault of the whole ſyſtem.

Both in the ophthalmia membranarum, and in the ophthalmia tarſi, it is neceſſary to obviate that glueing together of the eyelids which commonly happens in ſleep; and which may be done by inſinuating a little lard or any mild unctuous liniment between the eyelids before the patient goes to ſleep.

The ſlighter kinds of inflammation from the duſt or the ſun, may be removed by fomenting with warm milk and water, adding a ſmall portion of brandy; and by anointing the borders of the eye-lids with *unguentum tutiæ*, or the like, at night, eſpecially when thoſe parts are excoriated and ſore. But in bad caſes, after the inflammation has yielded a little to evacuations, the *cataplaſma aluminis* of the London Pharmacopœia ſpread on lint, and applied at bed-time, has been found the beſt external remedy. Before the uſe of the latter, a ſtrong ſolution of vitriolated zinc is preſcribed with advantage, or the following:

(No. 73.) ℞ Zinci vitriolati ſcrup. j.
Adipis ſuillæ præparatæ unc. ſs.

The vitriolated zinc being very finely powdered, is afterwards to be well incorporated with the lard.

(No. 74.) ℞ Zinci uſti drach. j.
Unguenti ceræ albæ drach. vj. Miſce.

This is the Edinburgh ointment of zinc. At St. Thomas's hoſpital a ſimilar remedy is employed, under the name of *unguentum ophthalmicum.*

In violent pains it is likewiſe of ſervice to foment frequently with a decoction of white poppy heads. One of the moſt common and moſt diſagreeable conſequences of ophthalmia, is an offuſcation of the cornea, ſo far obſtructing the paſſage of light as to diminiſh or prevent viſion. This is ſometimes ſo conſiderable as to admit of removal by operation: but in ſlighter caſes it may often be removed by the application of different gentle eſcharotics; and in this way, with little inconvenience, good effects are often obtained, from gently introducing into the eye, at bed time, a little calomel, powdered-ſugar, or the following liniment:

(No. 75.) ℞ Sacchari conditi
Oſſis ſepiæ } opt. lævig. ſing. drach. j.
Calomelanos ſcrup. j.
Mellis roſæ q. ſ. Miſce.

The following ointment, invented by M. Pellier, is recommended by Mr. Bell for the like purpoſes;

(No. 76.) ℞ Hydrargyri nitrati rubri,
Lapidis calaminaris præparati ſing. drach. iſs.
Lythargyri lævigati drach. j.
Tutiæ præparatæ drach. ſs.
Hydragyri ſulphurati rubri ſcrup. j.
Balſami Peruviani gutt. xv.
Adipis ſuillæ præparatæ unc. ij. Miſce.

Or this, which is the *unguentum ad lippitudinem* of St. Thomas's hoſpital:

(No. 77.) ℞ Ceræ albæ drach. ij.
Adipis ſuillæ præparatæ drach. vj.
Hydrargyri nitrati rubri optime lævig. drach. j.
Opii in pulverem triti gran. xij. Miſce.

Or the following ointment of Dr. de Gravers, which is employed, in ſuch caſes, at the Liverpool infirmary.

(No. 78.) ℞ Calcis hydrargyri albæ,
Tutiæ præparatæ,
Lapidis calaminaris præparati ſing. drach. ij.
Tincturæ benzoes compoſitæ drach. j.
Adipis ſuillæ præparatæ drach. iij. Miſce.

In caſes of leſs moment:

(No. 79.) ℞ Chryſt. tartar. }
Sacchari alb. } optime pulver. a a ʒij. Miſce.

In many caſes of opacity in the cornea, the cure may be gradually effected by the application of finely powdered glaſs.

Where means much leſs active may be thought ſufficient;

(No. 80.) ℞ Æruginis præparatæ gran. iv.
Ammoniæ muriatæ drach. ſs.
Aquæ calcis recentis unc. viij. Miſce.

This is the *aqua cupri ammoniati* of the New London Pharmacopœia, but prepared after that of Edinburgh with regard to the manner of introducing the copper. It is uſeful, when diluted, as a general collyrium alſo, after the inflammatory ſtage; but it is to be obſerved, that its introduction *into* the eye is indiſpenſably neceſſary.

The following is employed by Mr. Ware in the purulent ophthalmia to which children are ſubject:

(No. 81.) ℞ Aquæ cupri vitriolati camphoratæ drach. ij.
Aquæ diſtillatæ unc. iv. Miſce.

Where there is a diſpoſition to frequent returns of this affection, the Peruvian bark is often employed with ſucceſs in combating it; more eſpecially if accompanied with a ſolution of muriated quickſilver in the doſe of gr. $\frac{1}{2}$ twice a-day.

In proof of the efficacy of corroſive ſublimate, adminiſtered internally, in caſes of the ophthalmia accompanied with violent pain, the reader is referred to the ſeventh caſe in vol. I. of Mr. Ware's Chirurgical Obſervations, and to the remarks made on the Intermittent Ophthalmia, annexed to Obſervations on the Epiphora, &c. publiſhed in 1792, by Dilly in the Poultry.

By the term intermittent ophthalmia, Mr. Ware does not mean an ophthalmia accompanying a regular intermittent fever, but an ophthalmia, the uſual ſymptoms of which intermit and return at regular periods. Inſtances of the ophthalmia accompanying a regular intermittent fever have rarely occurred. The following, however, is the deſcription of a caſe of this kind given by Mr. Ware.

"A gentleman put himſelf under my care," ſays he, "in July, 1793, on account of a violent inflammation of the left eye, which was accompanied with a ſmall ulceration in the cornea, and an opacity in this tunic which extended nearly over the whole of the pupil. Previous to the attack of the ophthalmia, he had had a regular tertian ague, which, after continuing a long time, had been cured by his taking a large quantity of the cortex Peruvianus. He was ſcarcely recovered from the ague, when the ophthalmia commenced, and it had continued a fortnight before I ſaw him. At this time the inflammation was ſo conſiderable, that it appeared neceſſary to apply three leeches to the left temple, and afterwards a bliſter, of the ſize of half a crown, of the ſame part. I alſo ſcarified the inſide of the eye-lids, ſeveral ſucceſſive days, with the point of a lancet; after which, by the application of the citrine ointment and thebaic tincture, together with common antiphlogiſtic remedies, the ophthalmia was greatly diminiſhed; but, before he was quite well, the ague returned with its uſual violence. A draught compoſed of an ounce and a half of the decoction of Peruvnia bark, with a drachm and a half of the tincture, and a drachm of the ſal catharticus amarus, was now given him every ſix hours; and after the ſecond fit, which was more violent than the firſt, a ſcruple of the red bark was added to every doſe of the decoction, ſtill joining with it a drachm of the ſal cathart. amar. and giving it every three hours inſtead of every ſix. The citrine ointment and thebaic tincture were daily applied to the eye as before. The third fit of the ague was much leſs violent than the former; and the inflammation continued to diminiſh. The fourth fit was ſtill milder than the third; and afterwards he had no return of it. The ophthalmia alſo, by a continuance in the ſame mode of treatment, was prevented from returning; the ulceration of the cornea healed; and the opacity of this tunic decreaſed ſo rapidly that in a ſhort time the patient recovered a very uſeful ſight."

For mere weakneſs of the eye, nothing in general anſwers better than regular cold bathing of the eyes by means of an eye-glaſs; rubbing the eye-lids occaſionally with æther or camphorated ſpirit of wine.

An intereſting account is given by Mr. Ware of a *peculiar ſpecies of ophthalmia*, with which we propoſe to conclude this ſection. After alluding to thoſe inſtances where mercurials have been of ſervice in removing conſiderable opacities in the cornea, and in ſome, where the opacity has been evidently ſituated in the capſule of the cryſtalline humour, he ſays,

"But, true as this is, it ſhould be remembered, that there is a diſeaſe of the eye, whoſe ſymptoms in many reſpects bear a reſemblance to thoſe I have laſt mentioned, but in which the adminiſtration of *mercury*, after repeated trials, has been found to be *evidently injurious*. This is a diſeaſe which happily does not often occur. I have ſeen ſufficiently of it, however, to be much alarmed whenever it comes under my notice; and I ſhall now endeavour to give the reader the beſt deſcription I am able, both of its ſymptoms and progreſs; to which I have great pleaſure in being able to add the hiſtory of one which received a complete cure.

"A greater or leſs degree of the ophthalmia ſometimes precedes the other ſymptoms; but more commonly a confuſion in the appearance of objects is perceived by the patient before there is any viſible inflammation in the tunica conjunctiva; and when this confuſion has ariſen to ſo great a degree as to induce the patient to apply for medical aſſiſtance, the pupil is found to have loſt the power of dilating and contracting, and conſtantly retains the ſize which, when in health, it uſually has in a moderate degree of light. Shortly after this time a ſlight opacity becomes perceptible in this aperture; but the opacity, conſidered alone, is inſufficient to account for the cloudineſs and confuſion that embarraſs the patient's ſight; and ſometimes it is of ſo obſcure a kind that it is difficult to determine whether it be in the cryſtalline or cornea, or in that portion of the aqueous humour that occupies the ſpace between theſe parts. In this period of the diſorder, and, as has been obſerved above, occaſionally ſooner, a number of veſſels in the tunica conjunctiva become enlarged. The acceſs of light rarely gives pain to the eye; although in general the patient appears to avoid it, his ſight being leaſt affected when the eye is in the ſhade, and when the object he looks at is well illumined. In proceſs of time, if the progreſs of the diſorder be not checked, the colour of the iris takes a greeniſh aſpect, and an adheſion is formed between this tunic and the anterior portion of the capſule of the cryſtalline humour. In conſequence of this, the round figure of the pupil is loſt; its edges become jagged and irregular; and, at length, the capſule of the cryſtalline takes a white colour, and the ſight is totally and irrecoverably deſtroyed.

"Such is the deſcription of a diſorder, which, though not common, occurs too frequently to be a matter of indifference. Thoſe who are far advanced in life ſeem more ſubject to it than others who are younger; and notwithſtanding I have ſeen it in perſons who, in other reſpects, have enjoyed perfect health, it happens more frequently in thoſe who have experienced much anxiety and vexation.

"For the relief of it, I have not only tried, in its different ſtages, a great variety of remedies; but I have received information of many that have been preſcribed by other ſurgeons. Mercurial medicines, and all that have a tendency to debilitate the ſyſtem, have appeared to me to make the diſorder worſe. My principal dependence has hitherto been on the application of mild ſtimuli to the eye; to which when the conſtitution has been weakened either by anxiety, or by any other cauſe, I have uſually joined the adminiſtration of internal tonics. Electricity, in a few inſtances, has been thought to afford benefit; but I have had leſs experience of its efficacy in this than in ſome other diſorders to which the eye is ſubject. The application of æther, when mixed with a weak ſolution of hydrargyrus muriatus, has ſometimes appeared to me to be decidedly uſeful.

"In the inſtance of an elderly lady who had wholly loſt the ſight of one eye ſome years prior to the time of my being conſulted, and in a way ſimilar to that which is above mentioned (the pupil being contracted and irregular, and the capſule of the cryſtalline humour being evidently opaque, and adherent to the iris), and whoſe other eye began then to be affected in a ſimilar manner (her ſight with it being very confuſed, and miſty, and the pupil retaining only a ſmall degree of its contractile power), the application of a lotion, compoſed after the following preſcription, very ſpeedily diſſipated the miſt, and in a ſhort time enabled her, with help of the glaſſes ſhe uſually wore, to read in a common newſpaper. Three years have now elapſed ſince the time that this remedy was firſt uſed; and, between that period and the preſent, the lady has repeatedly been under the neceſſity of reſorting to a ſimilar lotion, and always with equal ſucceſs:

(No. 82.) ℞ Hydrargyri muriati gr. j.
Acidi muriatici. gutt. x.
Aquæ diſtillatæ. ℥ſs. Miſce S. A.
(No. 83.) ℞ Hujus ſolutionis gutt. xv.
Æther. ʒj.
Aquæ roſæ ʒvij.
Miſce fiat lotio; et applicetur paululum ad oculos, ope penicilli, cito poſt liquoris agitationem, bis vel ter in die.

"But," continues the author, "the caſe to which I beg leave particularly to direct the attention of the reader, is that which I now proceed to deſcribe. The blindneſs was here ſo far advanced, and the ſucceſs which attended the treatment that was adopted, ſo far exceeded the expectations that were formed, either by the gentleman who attended the lady with me, or by myſelf, that I am induced to relate the circumſtances which accompanied it with ſome minuteneſs.

"A lady, about 55 years of age, in the year 1787, was attacked with a ſevere pain in the head, for which, after having uſed a variety of remedies without ſucceſs, ſhe was recommended to try the effects of ſea air and ſea bathing. But ſhe had not been many days on the ſea coaſt, before an inflammation began in both her eyes; and this rapidly increaſing, ſhe ſoon returned to London for the aid of medical advice. She was here confined to a dark room ſeveral weeks; and when the inflammation abated, ſhe was diſtreſſed by the imaginary appearance of a conſiderable number of black moats or marks (uſually called muſcæ volitantes), which conſtantly moved before her eyes. In about ſix weeks the inflammation was ſubdued, and the lady recovered her uſual ſight; but the muſcæ volitantes remained, and were particularly troubleſome when the light was ſtrong. She ſuffered no other inconvenience, however, from her eyes until the year 1793; when the left eye became again inflamed, but without giving her pain; and, in addition to the appearances above deſcribed, the ſight of this eye became obſcured with a thick miſt. With a view to remove the inflammation, ſhe was bled with leeches on the temple, had a bliſter applied to her back, and took ſome ſtrongly purgative medicines; after which, by the advice of a gentleman of eminence in the profeſſion, ſhe began to take a ſolution of the hydrargyrus muriatus (which was given her once or twice every day), and to make uſe of a yellow ſnuff, which appears to me to have contained a conſiderable proportion of the hydrargyrus vitriolatus. At the ſame time a variety of lotions were applied in ſucceſſion to the eyes themſelves. Theſe remedies were ſteadily continued ſeveral weeks; but under the uſe of them, the dimneſs in the ſight of the left eye greatly increaſed, and at length the patient was unable to diſtinguiſh with it any object whatever. The ſight of the right eye, which had hitherto continued good, with the exception of the muſcæ volitantes, began now to be affected, preciſely in the ſame manner in which the other eye had been firſt attacked. In this period of the diſorder, I was firſt deſired to viſit the lady; and I met, in conſultation, Dr. Grieve of Norfolk-ſtreet, and Mr. Thomſon, ſurgeon at Woodford. Many of the blood-veſſels of both eyes, and particularly of the left, were at this time much enlarged; but the appearance they made was very different from that of a common ophthalmia; the eyelids as well as the eyes having a peculiarly dry but relaxed look, and both being wholly free from pain. The left cornea had a deeply opaque ſpot in its inferior part, and a dullneſs over its whole extent; but the greater part of the pupil was perfectly viſible, and the dulneſs in its appearance was inſufficient to account for the total loſs of ſight in this eye. The right cornea had a ſimilar dull look, but there was no defined opacity on one part more than on another. Both pupils were of the ſize which they uſually have in a moderate light, and did not retain the ſmalleſt degree of power to dilate or contract. The near proſpect of total blindneſs had not only much hurt the lady's ſpirits, but, joined with the weakening power of the medicines ſhe had taken, had produced a conſiderable degree of general debility. Strengthening remedies * were adminiſtered internally; and a lotion compoſed of æther and a weak ſolution of hydrargyrus muriatus, in the way in which it was mixed in the caſe laſt mentioned, was recommended to be applied to both the eyes, three or four times every day. Theſe, however, producing no ſenſible amendment, were in a ſhort time wholly omitted; and, in their ſtead, the uſe of a fume, produced by burning a mixture of three parts of the herb eyebright, and one part of plantain leaves, was adopted; which was applied about five minutes daily to each eye, by means of a machine ſomewhat ſimilar to that with which the fume of tobacco is injected in diſorders of the primæ viæ. Internal medicines of all kinds were omitted, during its uſe, except a cupful of the infuſion of eye-bright, which the patient drank every morning faſting. For a ſhort time a ſmall proportion of tobacco was mixed with the eyebright and plantain; but the tobacco was ſoon left out, being found to ſtimulate the eyes too powerfully. The immediate effect produced by the

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* Among other medicines of this claſs ſhe took the extractum pulſatillæ, vel anemonis pratenſis of Linnæus, by the particular recommendation of Dr. Grieve. This gentleman had a high opinion of its efficacy in caſes of general weakneſs, and eſpecially in thoſe wherein the ſight was affected. In the preſent inſtance, although it did no good to the eyes, it ſeemed to increaſe the patient's ſtrength and ſpirits.

fumigation on the eye was that of a mild ſtimulus, by which means it excited for a ſhort time a conſiderable flow of tears, but theſe ſoon ceaſed, and afterwards the eye always felt both lighter and eaſier. It was ſteadily continued two months before any conſiderable amendment took place in the patient's ſight. The eye, laſt attacked, was the firſt to experience a favourable change; and in about four months ſhe diſtinguiſhed with it large letters. Eight months elapſed before the left eye began to ſee at all; but in twelve, without any alteration in the mode of treatment, this like the other recovered its perfect ſight. The redneſs of the tunica conjunctiva was now wholly ſubſided; both the pupils were become clear; and their power to dilate and contract in different degrees of light returned to the ſtate in which they uſually are when the eyes are quite well."

SECT. II. *Of* WOUNDS *of the* EYELIDS *and* EYEBALL.

In caſes of ſuperficial *wounds of the eyelids*, it will be ſufficient to bring the edges of the wounds together and retain them in their place by ſlips of adheſive plaſter: but when a wound is deep, particularly when the tarſus is divided, it will be neceſſary to employ either the interrupted or the twiſted ſuture, care being taken that the ſutures be not carried through the inner membrane of the eyelid, otherwiſe the eye would be irritated and inflamed. After ſuch an operation, the motion of both eyelids ſhould be prevented, as much as poſſible, elſe no union of the divided parts can be obtained. After the ſutures are finiſhed, the eyelids ſhould be cloſed and covered with a pledget of emollient ointment, and over this ſhould be laid a compreſs of ſoft lint, and one of a ſimilar nature ought likewiſe to cover the ſound eye: then a napkin ſhould be made to preſs equally on both eyes, and be properly fixed. Inflammation ſhould be guarded againſt, or, if already preſent, it muſt be removed in the manner directed under the article *ophthalmia*. The ſutures may be removed in about three days from their introduction, when the parts will commonly be found reunited.

When a portion of the eyelid is ſo much deſtroyed, or perhaps ſo completely removed, as to prevent the remaining parts from being brought together, without obſtructing the motion of the eye, the beſt method will be to treat it with light eaſy dreſſings, truſting to nature for ſupplying the deficiency.

If the *cornea* be wounded, it will commonly be attended with partial or total blindneſs. If any of the other parts of the ball be wounded, the danger will generally be in proportion to the extent of the wound. The principal attention ought to be directed to the prevention or removal of inflammation. When pain occurs, it ought to be removed by opiates; and with theſe a ſtrict antiphlogiſtic courſe is to be enjoined.

When the wound is large, and the humours completely evacuated, blindneſs, with ſinking of the eyeball, will almoſt always be the conſequence; but in wounds of ſmall extent, by proper treatment, a cure may be made and the ſight preſerved.

Dr. Antonio Savareſi, one of the phyſicians to the French army in Egypt, having written on the cure and prevention of the *endemic ophthalmia* of that country, the following extract, tranſlated from the Italian, was communicated by Dr. Blane to the Editors of the Medical and Phyſical Journal.

Doctor Savareſi firſt divides this complaint into the ſthenic and aſthenic; the one depending on an exceſs, the other on a defect of tone. The former affects the bulb of the eye; the latter, ſometimes the *tarſus*, ſometimes the *tunica conjunctiva*.

"In the beginning," ſays he, "I purge in all the three ſpecies, without diſtinction, with an ounce of magneſia vitriolata.

"The ſthenic ophthalmia requires very cloſe and ſtrict attention, inaſmuch as the cure depends on the efficiency of the firſt remedies. In this caſe, a bliſter to the nape of the neck, and local bleeding from the temporal or jugular vein, are of great utility, and ought not to be omitted. An hour after the letting of blood, a ſenſible change in the complaint is perceived, and next day the violent pain of the part and the ſevere head-ache diminiſh, or at leaſt ceaſe to torture the patient. This effect is often retarded, and the complaint advances, accompanied with a ſlight feveriſhneſs. In order to ſtop this, it is neceſſary to repeat the bleeding and the purges.

"A low diet is preſcribed, a decoction of barley with cream of tartar, and a reſolving collyrium, compoſed of opium diſſolved in ſpirit of wine, added to decoction of ſaffron, which contributes to calm.

"This method of cure ſhould be continued till the ſwelling of the eyes is diminiſhed, and the eyelids begin to be turned up with a degree of ſwelling, an appearance which always proceeds from the weakening and relaxation of the veſſels. In conſequence of this change a ſaponaceous collyrium is ordered, which conſiſts in a ſolution of ſoap in ſpirit of wine, by the uſe of which the eye-lids reſume their natural ſituation, and eaſily open, ſo that the cornea being now viſible is found ſometimes red or covered with ſpots. In the firſt caſe, cold water with vinegar is employed with good ſucceſs; and in the ſecond, recourſe is had to the dry collyrium, compoſed of ſugar-candy, alum, and nitre, which deſtroys the ſpots in a few days. By means of theſe topical and internal remedies, a complete cure is effected in the ſpace of a month or two. If the complaint ſhould not be removed in that time, there will be too much reaſon to deſpair of a cure.

"With reſpect to the cure of the ſecond ſpecies of ophthalmia, I have applied only a tonic collyrium of white vitriol diſſolved in vinegar, water, and proof ſpirit. This remedy has afforded the utmoſt relief, and has cured the complaint radically in twenty days or a month.

"Another collyrium made of common ſalt diſſolved in vinegar and water, has ſerved to cure a third ſpecies of ophthalmic inflammation, which is more ſimple, but obſtinate like the preceding. In the maritime countries of Italy, I have ſeen this indiſpoſition cured with baths of ſea water.

"Many praiſe the application of emollient and reſolving cataplaſms in all the three ſpecies. Obſervation teaches us that this remedy is noxious, ſince it relaxes the part, increaſes the pain, and produces other evils.

"Such has been the *curative* method which I have uſed in the military hoſpitals of Egypt, to ſave from blindneſs thoſe unfortunate ſoldiers who were attacked with this diſeaſe, and placed under my care. Of a thouſand, or thereabouts, who were affected with this diſorder, I had the mortification to ſee two entirely loſe their ſight, and ſome others loſe the ſight of one eye."

The *preventive means* are thus deſcribed. "The means I am going to point out," ſays he, "cannot be practiſed by ſoldiers, as their neceſſary duties do not admit of it; but they may be of aſſiſtance to thoſe who have the proper convenience for availing themſelves of them.

"Firſt, expoſure to the rays of the ſun with the head uncovered ſhould be avoided, and to the humidity of the night without ſome precaution to ſhelter oneſelf from it. In the ſecond place, it is neceſſary to bathe the eyes twice or thrice a-day with fair water mixed with vinegar or lemon juice, eſpecially when the organ has been irritated by duſt, ſmoke, or any external ſubſtance; and when it has been weakened by too much ſunſhine or humidity, it ought to be ſprinkled with ſpirituous or other tonic liquors. Finally, it will be adviſable to abſtain from ſalted food, and at the ſame time to maintain ſuitable perſpiration; to preſerve the hair of the head a little long, to avoid expoſure to cold after being heated, and to attend to the inteſtinal evacuations."

Dr. Savareſi adds, that the ſucceſs of theſe ſimple preſervatives has been confirmed by obſervation and experience: when ſeaſonably practiſed, they prevent the diſorder, and preſerve the ſight.

SECT. III. *Of the ſpontaneous* DISEASES *of the* EYELIDS.

The eyelids are ſubject to be infeſted with *tumors* of different kinds, which frequently require the aſſiſtance of ſurgery. The firſt of theſe is the hordeolum or ſtye, which frequently grows on the edge of the eye-lid, and is attended with heat, ſtiffneſs, and pain; and, unleſs proper means be taken to prevent it, a ſuppuration is frequently the conſequence. It may be conſidered as a common abſceſs ſeated in an obſtructed ſebaceous duct or gland. It may generally be removed by diſcutient applications. Should theſe prove ineffectual, it ought to be brought to ſuppurate by a ſmall emollient poultice, when it will commonly heal of itſelf; but if it do not, it ſhould be opened with the point of a lancet, that the matter may be diſcharged; and the part may be anointed afterwards with ſaturnine ointment.

The eyelids are ſubject to encyſted tumors, ſteatoms, warts, &c. which are to be treated like the ſame tumors when ſeated in other parts of the body; only, in extirpating theſe tumors, ſhould part of the eyelid be removed entirely, no dreſſings can be applied, as however mild they may be, they would irritate and inflame the ball of the eye. All that can be done, therefore, in ſuch caſes, is to lay the lips of the ſore as nearly together as poſſible, and frequently to remove any matter that may form on it.

The *eyelaſhes* are ſometimes ſo much *inverted* as to rub upon the eye and create much pain and inflammation. Various cauſes are aſſigned for this, ſuch as the hairs themſelves taking a wrong direction; inverſion of the tarſus or cartilage of the eyelid; ſome cicatrix formed upon the ſkin of this part after wounds or abſceſſes; tumors preſſing the hairs in upon the eye; and, finally, a relaxation of the external integuments.

The treatment of this diſorder muſt depend much upon a knowledge of the cauſe. When it is owing to a derangement of the cilia themſelves, if they have remained long in this ſtate, it will be extremely difficult to make them recover their proper direction. They ought, therefore, to be pulled out by a pair of forceps, and the part waſhed with ſome aſtringent lotion: and if the new hairs appear to take a ſimilar direction, which is very apt to happen, as ſoon as they are long enough they ought to be turned back upon the eyelid, and kept there for ſeveral days, or even weeks, by adheſive plaſter. When the diſeaſe proceeds from a contraction of the orbicular muſcles, the contracted part may be cut from the inner ſurface of the eyelid; in which place a cut commonly ſoon heals. If the cauſe proceed from a tumor or cicatrix, this muſt be removed before a cure can be expected; or if it be owing to relaxation of the ſkin, the parts ought to be bathed with ſome ſtrong aſtringent. If this fail, the relaxed ſkin ſhould be removed, and the part healed by the firſt intention. Sometimes the cilia of the upper eyelids are turned in conſequence of dropſical ſwelling in that place. When this happens, the water is to be evacuated by a few punctures with a lancet; but when ſuch means fail, and when the diſeaſe is quite local, if viſion be diſturbed, a ſufficient part of the ſkin ought to be removed with a ſcalpel, and a cure made by adheſive plaſter or the twiſted ſuture.

On the inverſion of the eyelids, Mr. Ware offers the following practical remarks.

" In the enumeration of the common cauſes of the ophthalmy," ſays he, " the laſt-mentioned was an *inverſion of the edges of the eyelids*. For an ophthalmy thus produced, a palliative cure may be effected; or, to ſpeak more conformably to the fact, a preſent and temporary relief may be given to the patient, by taking out the laſhes with a forceps, a pair of nippers, or any inſtrument of the like kind. But while the lids retain this inverted ſtate, no ſooner do the hairs grow again, than the diſorder will again return; nor can the patient be ever properly ſaid to be cured of the complaint, till the edges of the lids are reſtored to their natural poſition, and can be kept in it.

" It is however neceſſary, that a diſtinction be made between an inverſion of the upper and lower lid. For though an inverſion of either will produce the ſame effect, yet, in the different lids, it appears to ariſe from different cauſes, and, conſequently, to require different methods of cure.

" The upper lid and its ciliary edge, both in motion and at reſt, are preſerved in their natural ſituation by the equal, though contrary, actions of the muſculus orbicularis, and levator palpebræ ſuperioris. But the lower lid, whoſe motion is very ſmall in compariſon with that of the former, has no muſcle correſpondent to the levator of the upper; and is preſerved in its natural ſtate by the equal action of the orbicular fibres ſpread over it, and the counteraction of the ſkin which covers it: in which laſt reſpect it differs materially from the upper lid, the ſkin of which, on the contrary, being always very thin and flaccid, is incapable of any ſuch counteracting power.

" From the above account, it is manifeſt, that when the trichiaſis affects the upper lid it muſt be owing to a relaxation of the levator palpebræ ſuperioris, and a contraction of the ſuperior part of the orbicularis; whereas, in the caſe of a trichiaſis affecting the lower lid, it can only ariſe from a relaxation of the ſkin, and a contraction of the inferior part of the orbicularis. And as in theſe two caſes the cauſes of the diſorder are very different, ſo they will of conſequence require a very different treatment. In the trichiaſis of the lower lid, it will be neceſſary to increaſe the counteracting power of the ſkin which covers that lid, ſo as to prevent the contraction of the muſculus orbicularis. whereas, in the trichiaſis of the upper lid, it is plain that the ſole object of attention muſt be, to give an additional ſtimulus to the levator palpebræ ſuperioris, for the purpoſe of exciting it to proper action.

" The trichiaſis of the upper lid happens but ſeldom. But in an inſtance of this kind, which did occur, an entire cure was produced by an operation hereafter to be deſcribed, which was performed by a gentleman of great eminence in his profeſſion, to whom I am indebted for the information."

The operation is deſcribed in a caſe communicated to Mr. Ware, the particulars of which are as follows:

"The worſt kind of trichiaſis," ſays the relater, "which I ever ſaw, was in a young gentleman about 18 years of age. Previous to my ſeeing him he had repeatedly undergone the uſual diſcipline of extracting the hairs from the cilia: but when they grew again, they took their uſual courſe towards the tunica conjunctiva; and by continual irritation of that membrane, gave conſtant pain, and produced what writers on diſeaſes of the eyes call chemoſis, and what gives me the idea of fungous fleſh, or of a villous ſurface, reſembling the pile of red velvet. After a variety of treatment, as bleeding, purging, bliſtering, ſetons, bark, alteratives, and the uſe of every other method which the moſt eminent practitioners, both in phyſic and ſurgery, could think of, recourſe was had to eye-waters and ſalves, and the panaceæ of the moſt celebrated empirics of the time: but all proved ineffectual, and the young gentleman became totally blind.

"At this period I was conſulted, and at the ſame time was aſked if I had any objection to the opinion of a celebrated itinerant oculiſt, who was at that time in England. I ſaid, certainly not. We accordingly met; and when we had examined the eye, and heard what had been done, he propoſed the taking off a fold of the ſkin of the ſuperior palpebra. I told him I ſhould not object to his making the attempt, if the gentleman and his father gave their conſent: though I own it was my opinion that it would not ſucceed. At that time I had not conſidered the caſe ſufficiently, though I intended to do it very critically before we met again. A day for the operation was fixed: but, previous to that, the oculiſt ſent a meſſage to the young gentleman's father, which diſcovered the true charlatan, and immediately determined the gentleman not to have any more to do with him. I was again ſent for, and, having well conſidered the caſe, I freely delivered my ſentiments, that the method which had been propoſed, did not ſeem likely to me to be ſucceſsful, as the fault was not in a ſuperfluity of ſkin, but in a relaxation of the elevator palpebræ ſuperioris muſcle. Having premiſed this, I recommended and performed the following operation. I made an inciſion through the integuments of the upper lid, from the inner angle of the eye to the outer; I then ſeparated the fibres of the orbicularis, ſo as to denudate the expanded fibres of the elevator muſcle, as near to their termination in the edge of the lid as poſſible; which being done, I applied a ſmall cauterizing iron, adapted to the convexity of the globe of the eye, and made pretty warm by paſſing it two or three times over the tendino-carnous fibres. My intention in this was to occaſion a ſlight irritation, which I hoped would produce the ſame effect, as we frequently obſerve to happen after burns in different parts of the body, eſpecially in the hands, after which the fingers often contract, and in many inſtances have remained contracted ever after. This happy effect took place in the preſent caſe: and though the eyelid was kept conſtantly higher than I could have wiſhed, the trichiaſis was cured, the inflammation ſubſided, and the eye became uſeful."

"The *trichiaſis* of the lower lid is a more common complaint. When it is recent, a cure has ſometimes been accompliſhed, by making a fold in the ſkin below the inverted lid, to draw its edge from the eye. In ſome caſes, nothing more will be requiſite to preſerve the fold than to cover it with a piece of ſticking-plaſter. But at other times, when the plaſter cannot be made to faſten, it will be neceſſary to uſe an inſtrument for the purpoſe, which muſt be ſo contrived as to take up a ſmall portion of the ſkin, and to hang by it on the cheek." Of ſuch an inſtrument mention is made in the caſe hereafter related.

"When the diſorder is ſlight," continues Mr. Ware, "the ſkin may be reſtored to its natural ſtate by the methods above deſcribed. But in more obſtinate caſes I have generally been obliged, for the ſame end, to cut off a ſmall tranſverſe portion of the looſe ſkin below the edge of the lid, and afterwards confine the ſides of the wound together, by means of two or three ſutures; which has effectually anſwered the purpoſe. In the following caſe theſe circumſtances appear.

"S. S. at about 50 years of age, applied to me, on account of an inflammation in her left eye, which had continued nearly two years; notwithſtanding the uſe of various medicines and applications, recommended by different perſons. On examining into the caſe, it was evident that the inflammation was cauſed by an inverſion of the lower lid, which occaſioned the laſhes to rub conſtantly againſt the eye. She had, for many years, been ſubject to convulſive fits, which affected every part of her body; and the diſorder in the eye firſt came on, after a ſevere attack of this kind. I immediately applied ſticking-plaſter to the lid, and continued it down upon the cheek; by which a fold was made in the ſkin below the lid; and this effectually anſwered my deſign of keeping out the edge of it, ſo long as the plaſter remained well on the part: but, after trying it for ſeveral days, I found that it was very liable to ſlip; and that, when this happened, the lid immediately returned to its inverted ſtate. I therefore fixed an inſtrument, ſomething ſimilar to that contrived by Bartiſchius, and repreſented by Heiſter in his 15th pl. fig. 20, upon the ſkin below the lid, and let it hang upon the cheek; which, by its weight, kept the lid from becoming inverted: but as the benefit it produced was only temporary, and the pinching of the ſkin which was neceſſary to confine it gave the patient pain, I ſoon omitted the uſe of it, and performed the following operation: I firſt took off a tranſverſe fold of the ſkin, below the edge of the lid; and then, by the ſutures, confined the ſides of the wound cloſe to each other. The day after the operation, the integuments ſurrounding the eye were conſiderably ſwelled; but the ſwelling ſoon ſubſided, by the uſe of the aqua ſaturnina, applied as a fomentation. No difficulty afterwards occurred: the eyelids continued conſtantly in their natural ſtate; the inflammation of the eye was ſpeedily removed; and the patient became perfectly well.

"Some time after, the ſame woman applied again with an inflammation in her right eye, which aroſe, like the former, from an inverſion of the lower lid. The left eye had been quite well ever ſince the operation. The ſame was performed on this eye; and, being followed with the fomentation, as before, to reduce the conſequent ſwelling, it as readily effected a perfect cure.

"There are caſes, however, in which none of theſe methods will be ſufficient for the cure: as, where the ciliary edges are not only inverted, but likewiſe contracted in length.

"Under theſe circumſtances, relief is to be obtained no other way, but by enlarging the circumference of the ciliary edges. This may be done, either by an inciſion at the outer angle, or by a complete diviſion of the cartilage, called tarſus, in the middle. The firſt of theſe operations is no more than a ſimple ſtraight inciſion, which may be made with a ſharp-pointed curved biſtoury. The laſt, which is ſeldom neceſſary, will alſo be beſt performed by the ſame inſtrument; only obſerving, that the point be carefully introduced between the globe and eyelid, and carried below the cartilage, that is, about one-eighth of an inch in the whole; whence it is to be puſhed outward in a horizontal direction, till it has cut its way through the lid: the cartilages being thus entirely divided, each portion will recede towards the angles, and a ſeparation be left between them, which will not only take off the complaint for the preſent, but prevent the poſſibility of its return in future."

When the *gaping eye* takes place to any great degree, it is attended not only with much deformity and uneaſineſs, from a large portion of the lining of the eyelid being turned outwards, but likewiſe from too much of the eye being expoſed. The diſorder may ariſe from an enlargement of the eyeball, from dropſical ſwelling, or from the cicatrix of an old wound or abſceſs: hence it is frequently produced by the ſmall-pox, burns, or ſcrophula; but more frequently by a laxity of the part in old age.

When the diſorder is induced by an enlargement of the ball of the eye, nothing but a removal of this ſwelling can be effectual. If from dropſical ſwelling, when this is connected with general anaſarca, the affection of the ſyſtem muſt firſt be cured; but if it appear to be local, nothing anſwers ſo well as punctures. When it ariſes from a cicatrix, the ſkin ſhould be divided, and the effects of inflammation guarded againſt. If it be owing to inflammation, the antiphlogiſtic courſe muſt be uſed; when it ariſes from old age, the eyes ought to be daily bathed with cold water, or ſome aſtringent and ſtimulant ſolution.

Concretion of the eyelids ſometimes ariſes from a high degree of ophthalmia; in which caſe the eyelids are not only connected by their edges to each other, but now and then grow to the ſurface of the eyeball. A coheſion is ſometimes obſerved alſo in children at birth. When the adheſion is ſlight, it may in general be removed by the end of a blunt probe; but when it is conſiderable, a cure can only be effected by a cautious diſſection. If the eyelids on one ſide be ſound, they will ſerve as a guide to direct the inciſion. The tarſi are carefully to be divided from each other; after which, if there be no other adheſions, the eyelids may be readily opened; but if they adhere to the eye, the operator is gently to pull and ſeparate the eyelids, while the patient is deſired to move the eye in the oppoſite direction. When this is effected, nothing further is neceſſary than to drop a little oil upon the eye, and cover the eyelids with ſoft lint ſpread with ſome cooling emollient ointment. The oil and ointment are frequently to be repeated, and every precaution taken to prevent inflammation and irritation.

SECT. III. *Of* SPECKS, FILMS, *or* EXCRESCENCES *on the* EYE.

Specks are ſometimes formed upon the white part of the eye, but more frequently upon the cornea. In the former caſe they are ſeldom attended with much inconvenience, but in the latter they are often the cauſe of partial or total blindneſs. They are almoſt univerſally the conſequence of inflammation, and ſeldom go much deeper than the tunica adnata. Two very different ſtates of the diſorder occur: the one from an effuſion immediately under the outer layer of the cornea, and in this caſe the cornea does not appear to be raiſed; the other takes place from one or more little ulcers, which breaking, leave as many opaque ſpots in the centre, which are more elevated than the reſt of the cornea: and the inconvenience attending either ſituation muſt always be in proportion to their extent and degree of opacity, or their vicinity to the pupil. When viſion is little affected by them, they need ſcarcely be conſidered as an object of ſurgery; but whenever viſion is materially impaired, remedies become neceſſary, and theſe ſhould be ſuch as are beſt ſuited for removing inflammation, promoting abſorption, and reſtoring tone to the veſſels.

Veſſels running upon the ſurface of the eye into the ſpeck are to be divided, and the eye frequently bathed with ſome refrigerant collirium. By theſe means the ſimpleſt kind of ſpecks, when recently formed, may generally be removed: but where they have been of long ſtanding, their removal is attended with great difficulty. Where the ſpeck is owing to an effuſion of fluids between the layers of the cornea, and where it is not attended with any prominence, local applications are of little advantage, as it is impoſſible to remove the effuſed matter without injuring the cornea; but conſiderable ſervice is derived from the uſe of ſuch remedies as are moſt effectual for promoting abſorption; and with this view, a gentle long-continued courſe of mercury, briſk purgatives occaſionally, and iſſues in the neck, are found to be the moſt effectual remedies.

In the management of ſpecks which are prominent upon the cornea, and where inflammation is removed and the opacity is conſiderable, if the cornea beneath be ſound, the removal of the diſeaſed part will leave it tranſparent and fit for viſion. The remedies proper for this purpoſe are eſcharotics or the knife. The former are applied in the form of a powder, an ointment, or a waſh; and theſe ought to be very finely prepared, otherwiſe they will be in danger of irritating and inflaming the eye: and they ought merely to be of ſuch ſtrength as the eye can eaſily bear.

The applications ſhould be long perſiſted in and frequently repeated; and to make them ſtill more uſeful, ſome of the powders or ointments may be applied evening and morning, and the ſolution two or three times through the courſe of the day. To the remedies already mentioned cauſtic is ſometimes preferred. With this the centre of the ſpeck is to be frequently touched, till the patient complain of conſiderable pain, when pure water is to be applied by a pencil, or by dipping the eye in water, with the eyelids open, till the pain occaſioned by the application of the cauſtic be removed. The eye is then to be covered with compreſſes moiſtened in ſome ſolution, and this frequently repeated. The cauſtic may be repeated every ſecond or third day, unleſs prevented by inflammation. When the ſurgeon chooſes to employ the knife, which frequently may be more effectual, the eye is to be fixed by a ſpeculum (fig. 19), or levator (fig. 20); the tumor is then to be cautiouſly ſeparated by means of a ſmall knife, and every attention paid to prevent inflammation. Theſe are the methods moſt likely to be of ſervice; and when properly managed they will frequently remove ſpecks, which otherwiſe would entirely deprive the patient of the uſe of the eye; though it is to be regretted that caſes frequently occur which baffle art.

A membranous excreſcence, called *ptergyrium*, is frequently found upon the white part of the eye, which often ſpreads over the cornea ſo as entirely to deſtroy viſion. It is ſometimes owing to external injuries; at other times it ariſes from a general diſeaſe of the ſyſtem, as lues venerea or ſcrophula; but inflammation is always the more immediate cauſe.

By a proper application of the remedies above mentioned, affections of this kind may generally be prevented from becoming formidable; but when the reverſe takes place, and excreſcences begin to ſpread over the cornea, other means muſt be uſed. When the diſeaſed part is only ſlightly attached, it may be freely removed by a cut of the knife; but when this cannot be done without difficulty, it is better to deſtroy the veſſels by the extenſion of which this ſubſtance is chiefly formed. The manner of performing the operation in general is this: the patient being properly ſeated, the eyelids opened, and the eye ſecured, the operator, with a ſmall knife, makes a ſcarification through the whole thickneſs of the excreſcence, entirely round, and at a little diſtance from the circumference, by which the ſource of nouriſhment will be cut off; and, after the blooding is abated, one or two inciſions more may be made, in a ſimilar manner, within the former. Some practitioners raiſe the excreſcence with a needle and ligature before the inciſion is made; and, in ſome caſes, this may be done with advantage, though not in others.

After the bleeding is over, the part is to be bathed two or three times a-day with a weak ſaturnine ſolution; and the operation may be repeated occaſionally till the excreſcence is removed. In this way the operation commonly proves effectual; but inſtances ſometimes occur where, inſtead of being uſeful, it increaſes the diſeaſe. Whenever this happens, a palliative courſe is the only thing to be tried; and although it will not remove the diſorder, it may commonly prevent the excreſcence from acquiring any additional ſize. With this intention it ought to be frequently bathed with the ſolution laſt mentioned, and afterwards covered with a cooling ointment. When the diſorder cannot even be palliated, when viſion is deſtroyed, and particularly when the pain attending it is ſevere, there is reaſon to ſuſpect cancer. In this caſe the eye ought to be extirpated, otherwiſe deeper parts may ſuffer, and the life of the patient be endangered. The method of performing this operation will be afterwards pointed out.

SECT. IV. *Of* ABSCESSES *in the* GLOBE *of the* EYE.

Though inflammation of the eye generally terminates by reſolution, inſtances ſometimes occur in which an abſceſs enſues. This is owing either to improper treatment, or a bad habit of body which counteracts all remedies. The greateſt danger attending theſe complaints is when they are ſituated on the cornea, as the cicatrix left by them may deſtroy viſion. When deep ſeated, a purulent matter is ſometimes apt to be formed in ſome of the chambers of the eye, the ball becomes enlarged, the humours are diſturbed, and neither the iris, pupil, nor lens, can be diſtinguiſhed. In ſome rare caſes again, after theſe appearances have continued ſome time, the cornea burſts, part or the whole of the humours are evacuated, and the iris protrudes in a thickened diſtended ſtate. This has now the appearance of an excreſcence, which is called *ſtaphiloma*, from a kind of reſemblance to a grape. But under this term ſome authors include all collections like thoſe above deſcribed. In moſt inſtances the cornea protrudes, but in others the tunica ſclerotica or opaque part is affected with partial ſwellings or protruſions.

While the diſeaſe is forming, beſides the loſs of ſight, the patient commonly feels great diſtreſs in the eye and head, accompanied by ſymptoms of fever. When no other diſtreſs is experienced than the loſs of ſight, the ſwelling is but ſmall and contains chiefly a watery fluid. In the treatment, as viſion is ſeldom preſerved, the principal thing is to abate the pain and remove deformity. There is another kind of abſceſs in the eye, termed *hypopyon*, where the matter is lodged in the ſubſtance of the coats. It is ſometimes produced by external injuries, but more frequently from puſtules of ſmall-pox. If this termination cannot be prevented by the remedies mentioned when we treated on OPHTHALMIA, the matter muſt be evacuated by an inciſion into the eye, not regarding the humours, as viſion previous to this time is entirely deſtroyed. The proper part is the cornea, or the moſt prominent part of the tumor.

A variety of this diſorder ſometimes, though rarely, happens, where the humours are abſorbed; but ſtill the ſame external appearances are obſerved. In this caſe a tumor is formed by a thickening of the coats, eſpecially the iris. The only means of relief is extirpation of the prominent part by the uſe of the knife. After the contents of the eye have been diſcharged, the parts are to be covered with a compreſs moiſtened with a ſaturnine ſolution, and the antiphlogiſtic courſe followed till a cure is perfected, or at leaſt inflammation removed. If the ulcers diſcharge a thin acrid matter, they may be waſhed two or three times a-day with a ſolution of corroſive ſublimate, or of vitriolated zinc, &c.

Fungous excreſcences, ſometimes conſidered as a cancer of the eye, are apt to form in both theſe diſeaſes after the matter is evacuated; but they may be prevented from increaſing to a conſiderable ſize by burnt alum finely powdered, or by touching them occaſionally with lunar cauſtic.

Ulcers on the eye may ariſe from the ſame cauſes which produce ulcers on other parts of the body, as wounds, burns, &c.; or they may ariſe from a general affection of the conſtitution, as lues or ſcrophula; but they are more immediately produced by inflammation. In the treatment, therefore, of ſuch diſeaſes, blood-letting, bliſtering, laxative and cooling applications, as already deſcribed in the caſe of ophthalmia, are to be employed. When the inflammatory ſtate is removed, their management muſt be almoſt the ſame with that for ſimilar affections in other parts of the body. When the diſorder ariſes from an affection of the ſyſtem, the primary diſeaſe muſt be attended to before a cure can be performed. With reſpect to the ſores themſelves, if acrid matter be diſcharged, we muſt have recourſe to detergent ointments and waſhes before a cicatrix can be formed. When theſe have not the deſired effect, and when the ſore becomes ſoft and higher than the reſt of the eye, aſtringent applications are moſt efficacious. If excreſcences be preſent, theſe are to be removed by eſcharotics, or by the knife. In ſome rare inſtances, excreſcences of a fungous nature are found to be connected with the interior parts of the eye, and become ſo prominent as even to reſt upon the cheek. When ſuch occur, nothing but the removal of the eye itſelf can effect a cure.

SECT. V. *Of* DROPSICAL SWELLINGS *of the* EYE.

The eye is ſometimes enlarged by an *accumulation of the aqueous humour.* The ſymptoms are, a ſenſe of fulneſs in the eyeball; by degrees the motions of the eyelids become impeded; viſion gradually becomes more and more imperfect, till at laſt the patient can only diſtinguiſh light from darkneſs. As the diſeaſe increaſes, the ball of the eye becomes greatly enlarged, and at this time the cornea begins to protrude; when, if a puncture be not made, the eye burſts and empties itſelf. This diſeaſe is apt to be confounded with ſtaphyloma. But in the dropſical ſwelling the patient is always ſenſible to the effects of light, and the pupil is obſerved to contract, which does not happen in ſtaphyloma. In the early ſtages of this diſeaſe, viſion may be preſerved by puncturing the under edge of the cornea, and allowing the aqueous humour to paſs out by the anterior chamber; or by puncturing the tunica ſclerotica a little behind the iris, by which the fluid will paſs out at the poſterior chamber. The puncture may be made either with a lancet, pointed knife, or with a very ſmall flat trocar. The eye ought afterwards to be dreſſed with a compreſs made moiſt with a ſaturnine ſolution, guarding againſt exceſſive inflammation. When the uſe of the eye is ſomewhat recovered, tone may be reſtored to the parts, and a return of the diſeaſe as much as poſſible prevented, by frequently bathing the eye in aſtringent lotions; but where the cornea is deſtroyed, the ſight cannot be reſtored: we can then only diminiſh the ſize of the eye, and render it ſomewhat more comfortable to the patient.

Blood may be *effuſed* into the chambers of the eye from various cauſes, as in putrid diſeaſes, or in conſequence of inflammation, but moſt frequently from a rupture of the blood-veſſels induced by external injury. In whatever way it gets into the eye, it mixes with the aqueous humour, and renders it opaque. It is ſometimes taken up by the abſorbents; when it happens otherwiſe, it ought to be diſcharged by a puncture.

A few inſtances have occurred where the blood has fallen to the under ſide of the eye, and remained there without mixing with the aqueous humour. In ſuch a ſituation it ought to be allowed to remain.

When a puncture is neceſſary, it is to be made in the ſame manner as in caſes of dropſy of the eye; only the opening may require to be ſomewhat larger, otherwiſe the blood may not paſs readily out.

After the operation, nothing is neceſſary but to apply a compreſs of ſoft lint, moiſtened with a weak ſaturnine ſolution.

SECT. VI. *Of the* PROTRUSION *of the* EYEBALL *beyond its* SOCKET.

The eye may *protrude* in conſequence of external violence, or from tumors forming behind it, or on account of ſome of the ulcers, excreſcences, or dropſical ſwellings, already mentioned. When the eye is forced out of its ſocket by external violence, if the eyeball be not entirely ſeparated from the neighbouring parts, it ought to be freed from any extraneous matter which may adhere to it, and immediately replaced; and if the optic nerve be not quite divided, the uſe of the eye may be recovered. With a view to prevent or moderate inflammation, every part of the antiphlogiſtic regimen ought to be ſtrictly adhered to. If the protruſion is occaſioned by a tumor, the cure muſt depend upon the removal of this; and if the diſeaſe has advanced ſo far that the bones are become carious, they muſt likewiſe be ſeparated. But more frequently, inſtead of the bones becoming carious, they aſſume a gelatinous or rather cartilaginous nature. In ſuch a ſituation an operation could be of little advantage. The beſt method to prevent the bones from being ſo affected is an early performance of the operation.

A few inſtances have happened of the eye being puſhed from its ſocket by an *enlargement of the lachrymal gland.* When this occurs, if the enlargement be conſiderable, the ſtructure of the eye will moſt probably be ſo much injured that viſion will be deſtroyed; but inſtances have occurred of this gland, in the enlarged ſtate, having been removed without any injury being done to the eye.

SECT. VII. *Of* CANCER *of the* EYE, *and* EXTIRPATION *of the* EYEBALL.

Scirrhus and cancer may ariſe from repeated inflammations of the eye, or from ſtaphyloma, or ſome of the other diſeaſes which frequently attack this organ. The ſymptoms are, an enlargement, hardneſs, and protruſion of the ball, with a red fungous appearance, ſometimes diſcharging thick yellow matter, but more frequently a thin acrid ichor. At firſt there is only a ſenſation of heat in the tumor; but this gradually increaſing, changes at laſt into darting pains, which likewiſe ſhoot through to the oppoſite ſide of the head. In this ſituation blood-letting, opiates, and emollient applications, may alleviate the pain. A hemlock poultice applied to the eye, and a waſh of lime-water, with a little opium diſſolved in it, and applied every time the poultice is renewed, gives ſome relief; but although the pain be moderated by theſe means, it does not prevent the diſeaſe from ſpreading, nor can any thing elſe but extirpation produce a radical cure.

After the diſeaſe is diſcovered to be cancerous, the operation ſhould be performed without delay, to prevent the parts in the neighbourhood, as well as the conſtitution at large, from ſuffering. In performing the operation, the patient ſhould be placed in a proper light, and the head ſupported by an aſſiſtant. If the eyelids are diſeaſed, they muſt be ſeparated along with the tumor; but where they are ſound, they ought to be carefully preſerved; and for this purpoſe they may be kept out of the way by two levatores held by aſſiſtants. When the eyeball protrudes conſiderably, the operator may lay hold of it with his fingers; but if this be impracticable, a broad ligature ſhould be introduced through the centre of it, that it may be the more readily removed from the orbit. Sometimes it will be neceſſary to enlarge the opening of the eyelids, by cutting the external angle to allow the eyeball to be more readily removed. The whole of the diſeaſed parts are now to be ſeparated by a knife bent ſo as to correſpond with the ſides of the orbit, guarding at the ſame time againſt wounding the perioſteum or the bones of the orbit, which are commonly extremely thin. The eye being in this manner extirpated, the hemorrhagy from the ocular arteries is to be ſuppreſſed by means of agaric, or by a bit of ſponge; then over this is to be laid ſoft lint, with a napkin to cover the whole. After ſuppuration takes place, the dreſſings are to be removed, when a little lint, applied with an emollient pledget over it, will be ſufficient as long as any matter is diſcharged. After the wound is healed, the deformity may be in ſome meaſure obviated by wearing an artificial eye; though it is chiefly in caſes where part of the humours of the eye have been evacuated that this can be uſed with much propriety; for when the orbit is empty the artificial eye ſinks too far into it.

SECT. VIII. *Of the* CATARACT.

The ancients, and the more modern writers, had a confuſed idea of the *ſeat of the cataract*; different authors placing it in different parts of the eye. It conſiſts of an affection of the cryſtalline lens or of its capſule, by which the rays of light are prevented from falling upon the retina; and is therefore the ſame diſeaſe with the glaucoma of the ancients. It commonly begins with a dimneſs of ſight; and this generally continues a conſiderable time before any opacity can be obſerved in the lens. As the diſeaſe advances the opacity becomes ſenſible, and the patient imagines there are particles of duſt or motes upon the eye, or in the air. This opacity gradually increaſes till the perſon either becomes entirely blind, or can merely diſtinguiſh light from darkneſs. The diſeaſe commonly comes on rapidly, though ſometimes its progreſs is ſlow and gradual. The opacity of the lens is found to be nearly in proportion to the degree of blindneſs the patient is affected with: it gradually changes from a ſtate of tranſparency to a perfectly white, or light grey colour. In ſome very rare inſtances a black cataract is found. Sometimes the diſeaſe is confined to a particular ſpot of the lens, but generally the whole is affected. The conſiſtence alſo varies, being at one time hard, at another entirely diſſolved. When the eye is otherwiſe ſound, the pupil moves according to the degree of light in which it is placed. This diſeaſe is ſeldom attended with pain; ſometimes, however, every expoſure to light creates uneaſineſs, owing probably to inflammation in the bottom of the eye. The real cauſe of cataract is not yet well underſtood. Numbers of authors conſider it as proceeding from a preternatural contraction of the veſſels of the lens, ariſing ſometimes from external violence, though more commonly from ſome internal and occult cauſes. The diſeaſe is diſtinguiſhed from the gutta ſerena, by the pupils in the latter being never affected with light, and from no opacity being obſerved in the lens. It is diſtinguiſhed from hypopyon, ſtaphyloma, or any other diſeaſe in the fore-part of the eye, by the evident marks which theſe affections produce, as well as by the pain attending their beginning. But it is difficult to determine when the opacity is in the lens or in its capſule. The lens is generally affected; when the capſule is the ſeat of the diſeaſe, it is termed the membranous cataract.

With reſpect to the *treatment:* if the diſeaſe be in the incipient ſtate, mercury, particularly calomel in ſmall doſes, has been attended with ſome advantage. When any degree of inflammation is preſent, blood-letting and cooling regimen will ſometimes be neceſſary. Electricity, extract. hyoſcyami, flammula Jovis, &c. have likewiſe been extolled; but after theſe or other remedies have failed, the cure muſt depend upon a chirurgical operation. For this purpoſe two methods are in general uſe. The firſt of theſe, and which was practiſed for a long time before the other, is called *couching*. It is done with a view to allow the rays of light to fall upon the retina; and it conſiſts in removing the lens from its capſule, and lodging it in ſome part of the vitreous humour, where it may be away from the axis of the eye, and where it is ſuppoſed, in courſe of time, to diſſolve.

The other method is termed *extraction*, where, after an inciſion has been made in the cornea, the lens is puſhed through the pupil, and then entirely removed from the eye. Each of theſe methods has been much practiſed, and it is ſtill a matter of doubt to which we ought to give the preference. The next circumſtance deſerving attention is the time at which the operation for couching or extracting can with moſt propriety be performed. Formerly it was thought neceſſary to wait till the lens had a certain degree of conſiſtence, or was become ripe; but no certain marks of fluidity or firmneſs have been yet diſcovered; neither indeed is there any neceſſity for attending particularly to it, as the operation may be practiſed in every period of the diſeaſe, providing the retina be ſound, the iris have the power of contracting, and the cornea be tranſparent. The proper time for the operation is when the opacity of the lens is ſo conſiderable as to prevent the patient from following his ordinary occupation. When this is not the caſe, or when the patient has the uſe of one eye, it ought not to be performed, as it is always attended with ſome degree of riſque.

1. When the operation is to be performed, the following is the method of doing it: and firſt, *of couching the cataract.* To guard as much as poſſible againſt the effects of inflammation, the patient ſhould be confined, for ſeveral days previous to the operation, to a low regimen; and two or three doſes of ſome cooling laxative ſhould be given at proper intervals. After this he is to be ſeated with his face towards the light; but ſun-ſhine ought to be avoided. Some, however, prefer a ſide-light, both on account of the operator and patient. One aſſiſtant is to ſupport the head, while others ſecure the arms. The operator is either to be ſeated with his elbow reſting upon a table; or, which is preferred by ſome, he ought to ſtand, reſting his arm upon the ſide of the patient. The eye being fixed by the ſpeculum (fig. 19), or in ſuch manner as to allow the whole of the cornea and a ſmall portion of the ſclerotic coat to protrude, a couching needle (fig. 21) is to be held in the right-hand, in the manner of a writing pen, if the left eye be the ſubject of operation; the ring and little fingers are to be ſupported upon the cheek or temple of the patient: the needle is to be entered in an horizontal direction through the ſclerotic coat, a little below the axis of the eye, and about one-fourth of a line behind the edge of the cornea, ſo as to get entirely behind the iris. If the needle be of the flat form, the flat ſide ought to be oppoſed to the iris, to prevent that ſubſtance from being wounded. The point of the needle is to be carried forwards till it be diſcovered behind the pupil. The operator is now commonly directed to puſh the point into the lens, and depreſs it at once to the bottom of the eye; but in this way the lens either burſts through the capſule at an improper place, or it carries the capſule with it, tearing it from the parts to which it is connected. Inſtead of this, the needle ought firſt to be puſhed into the lens near its under edge, as Dr. Taylor adviſes, and then carried ſome way down into the vitreous humour, ſo as to clear the way for the lens. It is then to be drawn a little back, and carried to the upper part of the capſule, when, by preſſing upon it, the lens, if ſolid, is to be puſhed down by one, or, if fluid, by ſeveral movements, to the bottom of the vitreous humour. It ſhould then be puſhed downwards and outwards, as Mr. Bell directs, ſo as to leave it in the under and outer ſide of the eye; where, in caſe it ſhould riſe, the paſſage of the light would be little obſtructed. The needle is then to be withdrawn, the ſpeculum removed, and the eylids cloſed; and a com-

preſs ſoaked in a ſaturnine ſolution is to be applied over them. Mr. Pellier's method is to cover each eye with a linen bag half filled with fine wool, applied dry, and fixed to a circular bandage of linen paſſed round the forehead: the whole is retained by a triangular napkin. The patient is then to be laid in bed, upon his back, with his head very little raiſed; and to be kept in this ſituation for about a week in a dark room. Unleſs he be of a weakly habit, he ought to be bled at the neck, or leeched at the temple, a few hours after the operation. He ſhould be kept upon low diet, and get ſmall doſes of opiates frequently repeated. His belly ſhould be kept moderately open by gentle purgatives. The dreſſings ſhould not be removed till inflammation is at leaſt ſo far gone that no danger will ariſe from uncovering the eye, which may generally be about the eighth or tenth day. Sometimes the patient perceives light immediately on the dreſſings being removed, but more frequently not till ſome time after.

Upon removing the dreſſings, if the cataract has again got back to the axis of the eye, a repetition of the operation may become neceſſary. Some time, however, after the inflammatory ſymptoms are gone, ſhould be allowed to elapſe before any other operation is attempted; for the cataract frequently diſſolves, provided the aqueous humour get free acceſs to it. Mr. Pott ſometimes, when he found the cataract to be of the mixed kind, did not attempt depreſſion, but contented himſelf with a free laceration of the capſule; in which caſes the lens hardly ever failed of diſſolving ſo entirely as not to leave the ſmalleſt veſtige of a cataract. When the operation is to be performed upon the right eye, the ſtraight needle muſt either be uſed by the left-hand, or the operator muſt place himſelf behind the patient. A needle (fig. 22), has been contrived, however, with a large curve, by which the operation may be readily performed with the right-hand, while the ſurgeon is placed before the patient; only the needle is entered towards the inner, inſtead of the outer, angle of the eye.

2. The firſt hint of extracting the lens ſeems to have been ſuggeſted by Mr. Petit, who propoſed to open the cornea and extract the lens when it was forced into the anterior chamber of the eye either by external violence or accidentally in couching. At firſt it was conſidered as a dangerous operation, and was ſeldom practiſed till about the year 1737, when Mr. Daviel propoſed and practiſed extraction in preference to couching. The operation is now performed in the following manner: the patient and operator being placed, and the eye fixed in the ſame manner as for couching, the ſpeculum, when the operation is to be done upon the left eye, is to be held in the left hand of the operator. It is neceſſary to make as much preſſure as will ſecure without hurting the eye. Neither ought the cornea to be preſſed too near the iris, leſt the latter be wounded. The operator now takes the knife (fig. 23), and holds it in the ſame way

as he does the needle for couching; he then enters the point of it, with the edge undermoſt, into the cornea about the diſtance of half a line from its connection with the ſclerotic coat, and as high as the centre of the pupil; he is then to paſs it acroſs the pupil to the inner angle in an horizontal direction, keeping the edge a little outwards to prevent the iris from being cut; the point is then to be puſhed through oppoſite to where it entered; the under half of the cornea is next to be cut, and at the ſame diſtance from the ſclerotica with the parts at which the point of the knife went into and came out from the eye.

In cutting the under half of the cornea, the preſſure of the ſpeculum upon the eye ſhould be gradually leſſened; for if the eye be too much compreſſed, the aqueous humour, with the cataract and part of the vitreous humour, are apt to be forced ſuddenly out immediately after the inciſion is made. The operator then takes a flat probe and raiſes the flap made in the cornea, while he paſſes the ſame inſtrument, or another probe (fig. 24), rough at the extremity, cautiouſly through the pupil, to ſcratch an opening in the capſule of the lens. This being done, the eye ſhould be ſhaded till the lens be extracted, or the eyelids are to be ſhut to allow the pupil to be dilated as much as poſſible; and while in this ſituation, if a gentle preſſure be made upon the eyeball at either the upper or under edge of the orbit, the cataract will paſs through the pupil more readily than it can do when the eyelids are open.

If the lens cannot be eaſily puſhed through the opening of the cornea, no violent force ſhould be uſed, for this would tend much to increaſe the inflammation. The opening ſhould be enlarged, ſo as to allow the lens to paſs out more freely. When the cataract does not come out entire, or when it is found to adhere to the contiguous parts, the end of a ſmall flat probe, or a ſcoop (fig. 25), is to be introduced, to remove any detached pieces or adheſions that may be preſent. The iris ſometimes either projects too much into the anterior chamber, or is puſhed out through the opening of the cornea. When this happens, it is to be returned to its natural ſituation by means of the probe already mentioned. Sometimes the opacity is not in the body of the lens, but entirely in the capſule which contains it. The extraction of the lens alone would here anſwer no uſeful purpoſe. Some practitioners attempt to extract, firſt the lens, and then the capſule, by forceps; others, the lens and capſule entire. Thoſe who have had much practice in this branch of ſurgery, as Pellier, ſay they find ſuch a method practicable; but others think it better to truſt entirely to time and a cooling regimen for the cure, which, in ſome inſtances, has taken place. When the operation is to be performed on the right eye, the operator is either to uſe the left hand, to take his ſtation behind the patient, or to employ a crooked knife (fig. 26).

After the operation is finiſhed, the eyelids are to be ſhut, and the ſame treatment obſerved as in couching. When the operation ſucceeds, the wound in the cornea is generally healed in little more than eight or ten days; but previous to this time, the eye ought not to be examined; and even then it ſhould only be done in a dull light, otherwiſe it may ſuffer conſiderably from the irritation which a ſtrong light might occaſion. When the eye is to be examined, if the eyelids be found adhering together, they ought to be waſhed with ſome gentle aſtringent. With this the eye ought alſo to be frequently waſhed afterwards, by which it will gradually recover ſtrength and ſight. About the end of the third week the dreſſing may be entirely removed, and a piece of green ſilk put over the eyes as a ſhade; and if every thing has ſucceeded, the patient may generally go out after a month from the time at which the operation was performed.

It ſometimes happens, that in extracting the lens a portion of the vitreous humour is evacuated. This does not in general prevent the ſucceſs of the operation. The eye ſoon begins to fill again, and in the courſe of two or three weeks it is for the moſt part as large as it was previous to the operation. Whether this be owing to a renewal of the vitreous humour, or merely an aqueous ſecretion, is not yet determined; though the latter circumſtance is generally ſuppoſed.

3. In the "*Actes de la Société de Médecine à Bruxelles*" are publiſhed ſome intereſting reflections on the vacillating cataract; by J. Forlenze, ſurgeon-oculiſt at the Hôtel-Dieu, &c.

This diſorder *(cataracte branlante)*, the author remarks, although it has been noticed by Celſus, and ſome other of the ancients, is neglected by the moderns, St. Ives alone having treated upon it, and that very ſlightly.

M. Forlenze gives a caſe of complete blindneſs in an elderly perſon from a gutta ſerena. The left eye exhibited, on examination, a very peculiar ſtructure, the cryſtalline lens appearing to range in different directions, with a tremulous motion, according to the poſitions of the eye itſelf. This phenomenon had been attributed by St. Ives to an adherence of the iris to the capſule of the cryſtalline humour; and of the truth of that opinion our author ſeemed fully convinced in the preſent caſe: he therefore reſolved to attempt effecting a ſeparation of theſe two adhering parts, with the view of clearing up the nature of the diſeaſe, rather than with the hope of a cure.

The patient being placed in the ordinary poſition, leaning his head on the boſom of an aſſiſtant, who with his two fore-fingers raiſed up the ſuperior eyelid, Mr. F. kept down the lower lid with his left fore-finger; and, at a moment when the patient was directing his eye outwardly, he plunged the ſcalpel obliquely, from above downwards and from without inwards, at the diſtance of a half line from the ſclerotica. The inciſion being then carried forwards to the oppoſite angle of the eye, at the ſame diſtance from the ſclerotic coat, a ſemilunar ſection was made through the inferior part of the cornea. At the ſame inſtant the operator likewiſe reſted the extremity of his fore-finger upon the globe of the eye, to prevent its yielding, and to afford a point of ſupport againſt his nail in the act of completing the inciſion downwards.

For the purpoſe of extracting the cryſtalline, Mr. F. employed a golden needle, mounted like the cataract-knife, nineteen lines in length, with cutting edges, flattened in the form of a lancet, and one line in breadth. This inſtrument, as well as the knife, was held in the manner of a writing pen; and, being conducted under the flap of the cornea, he paſſed it into the poſterior chamber of the eye, moving it in various directions, ſo as to deſtroy all the adheſions between the capſule of the cryſtalline and the iris. Theſe adheſions, he ſays, were more firm at the inner and upper parts than below. The lens immediately eſcaped, with its capſule, without applying the ſmalleſt degree of preſſure. The pupil remained perfect, and there appeared no derangement or diſſolution of the vitreous humour, as Maître Jean pretends will happen in this caſe.

The ſlighteſt compreſſes and bandages were uſed. No accident happened till the ſixth day, when a trifling ophthalmia ſupervened: but the event was quite as ſucceſsful as could have been reaſonably expected. The author offers the following reflections:

1. This caſe confirms the opinion of St. Ives, who thought it was occaſioned by an adheſion of the iris with the capſule of the cryſtalline.

2. It proves that this adherence may be favoured by the immobility of the iris, ariſing from a palſy of its nerves; whence it follows, that a gutta ſerena is one of the cauſes of a vacillating cataract.

3. It appears from the foregoing caſe, that, in ſimilar, circumſtances, relief ought to be attempted; and that it is poſſible, in deſtroying the adheſions, to obtain a degree of ſucceſs which ſurgeons have not hitherto deemed practicable.

The inſtruments commonly uſed for opening the cryſtalline capſule will, in the above caſe, prove but a feeble reſource for iſolating the iris. The needle ſubſtituted by M. Forlenze, for the apparatus of Wenzel and of La Faye, is much more ſimple and convenient.

M. Forlenze, in the ſame work, gives a curious caſe of complicated cataract: M. Carbonel, lieutenant-general of the artillery, in the 67th year of his age, had a diſeaſe of the left eye with the following complications: 1. A capſular cataract; 2. An adherence to the poſterior part of the iris; 3. A liquidity of the cryſtalline.

The author made a ſection through the cornea, as in the former caſe, and extracted the cryſtalline; but there was ſo firm an adheſion between the capſule and the poſterior part of the iris, that ſyringing was not effectual, and it was neceſſary to diſſect it off with his needle, aſſiſted by the forceps. He then perceived an opacity and thickening of the hinder part of the capſule adjoining the membrane of the vitreous humour; which cauſed extreme difficulty in extracting the whole, and obliged him to cut the remaining portion of it into three pieces with a ſmall pair of ſciſſars. In performing this operation, above half of the vitreous humour eſcaped, and M. Chopart, who aſſiſted him, thought there could be no hope of ſucceſs: but the author, having been taught by paſt experience that the vitreous humour might be regenerated, gave a favourable prognoſis. The patient got well, although an ophthalmia ſupervened, and he at length recovered his ſight.

M. Forlenze treated a caſe of cataract, having its centre opaque and ſolid, but its circumference liquid and tranſparent, in the following way:

After making a ſemilunar ſection of the cornea, and an inciſion into the capſule, the liquid part of the cryſtalline lens eſcaped; but the central portion, being firm, adhered to the poſterior part of the capſule. The adheſion was deſtroyed by a *curette*; the remaining portion of the lens was then extracted, and a few drops of very pure warm water were injected by means of a curious ſyringe invented by the author. Some ſtreſs is here laid on the uſe of this ſyringe and lukewarm water, for the complete extraction of the accompaniments. The author diſapproves of M. Anel's ſyringe, as being too capacious: his own is graduated, and will hold only twelve grains of water.

CHAP. XIV. OF THE FISTULA LACHRYMALIS.

BY this diſeaſe is properly underſtood a ſinuous ulcer of the lachrymal ſac or duct with callous edges; though every obſtruction of this paſſage is commonly called *fiſtula lachrymalis.*

The firſt and moſt ſimple ſtate of the diſeaſe is that termed a *dropſy of the lachrymal ſac.* The ſymptoms are, a tumor between the inner cornea of the eye and the ſide of the noſe. This diſappears by preſſure, the tears mixed with mucus paſſing partly into the noſe, but chiefly back upon the eye and over the cheek.

This ſtate of the diſeaſe is what the French have called the *hernia* or *hydrops ſacculi lachrymalis.* It is frequently met with in children who have been ricketty, or are ſubject to glandular obſtructions; and in this ſtate it ſometimes remains for ſeveral years, ſubject to little alterations, as the health or habit ſhall happen to vary, the ſacculus being ſometimes more, ſometimes leſs dull and troubleſome. The contents which are preſſed out are ſometimes more, ſometimes leſs cloudy; and now and then the diſeaſe is attended with a ſlight ophthalmy, or an inflammation of the eyelids, but which, by common care, is eaſily removed. If the ſacculus be not much dilated, the diſcharge ſmall, and produced only by preſſure, the chief inconveniences are the weeping eye, and the gumming together of the lids after ſleeping: but theſe, by being attended to, may be kept from being very troubleſome; and if the diſeaſe makes no further progreſs, may be ſo regulated as to render any more painful proceſs totally unneceſſary. If the dilatation be conſiderable, the ſwelling is more viſible, and the quantity of fluid is larger; it is alſo in this ſtate more frequently mixed and cloudy, and more troubleſome, from the more frequent neceſſity of emptying the bag: but if the patient be an adult, it may, even in this moſt dilated ſtate of it, be kept from being very inconvenient.

If an inflammation comes on, the tumor is thereby conſiderably increaſed; the diſcharge is larger, as well during ſleep as upon preſſure; the ſkin covering it loſes its natural whiteneſs and ſoftneſs, becomes hard, and acquires an inflamed redneſs; and with the tears a mixture of ſomething, which in colour reſembles matter, is diſcharged, eſpecially if the preſſure be made with any force, or continued for any time.

When the parts are in this ſtate, the contents of the bag have ſo much the appearance of purulent matter, that they are now generally conſidered as ſuch, though Mr. Pott, Mr. Warner, and ſeveral others, have been of a different opinion, conſidering the fluid as merely mucus under a different form; allowing, however, that pus is ſometimes diſcharged. If the puncta lachrymalia be naturally large and open, and the immanation confined to the ſurface of the ſac, its contents will paſs off pretty freely, and the ſkin will remain entire.

But when the ſkin covering the lachrymal bag has been for ſome time inflamed, or ſubject to frequently returning inflammations, it moſt commonly happens that the puncta lachrymalia are affected by it, and the fluid, not having an opportunity of paſſing off through them, diſtends the inflamed ſkin; ſo that at laſt it becomes ſloughy, burſts externally, and forms an opening in the moſt prominent part of the tumor, at which the tears and matter contained in it are diſcharged. When the opening thus formed is ſmall, it commonly heals again in a few days, but it burſts as ſoon as a conſiderable quantity of this fluid is collected; and it continues thus to collect and burſt alternately, till the opening becomes ſufficiently large to prevent any further collection. This ſtate of the diſorder exhibits exactly the appearances of a ſinuous ulcer, with callous, and ſometimes with retorted edges; and this ſtage forms properly the real fiſtula lachrymalis. Tears, mucus, and purulent matter, are now abundantly diſcharged from the ſore. When the bone beneath is ſound, this diſcharge is ſeldom either acrid or offenſive to the ſmell, for the opening being in general in the under part of the tumor, the matter is readily evacuated; but when any of the contiguous parts are carious, they are not only found to be ſo by the introduction of a probe, but by the appearance, ſmell, and effects of the matter upon the neighbouring parts. In this caſe it is thin, fetid, and commonly ſo acrid as to fret and corrode the integuments moſt contiguous to the ulcer; and when the diſorder is connected with ſcrophula or with lues venerea, which is by no means an unfrequent occurrence, the diſcharge and appearance of the ſore will vary according as it happens to be combined with one or other of theſe diſeaſes.

From what has been ſaid, we may divide this diſeaſe into four general heads or ſtates, under which all its more minute diſtinctions may be comprehended. The *firſt* conſiſts in a ſimple dilatation of the ſacculus and obſtruction of the naſal duct, diſcharging, upon preſſure, a fluid either quite clear or a little cloudy; the ſkin covering the bag being entire and perfectly free from inflammation. In the *ſecond*, the tumor is ſomewhat larger; the ſkin which covers it is in an inflamed ſtate, but entire; and the diſcharge made through the puncta lachrymalia is of a pale yellow or purulent colour. In the *third*, the ſkin covering the ſacculus is become ſloughy, and burſts, by which means the ſwelling is in ſome meaſure leſſened: but the matter which, while the ſkin was entire, uſed to be preſſed out through the puncta lachrymalia, now diſcharges itſelf through the new aperture. The ductus ad nares, both in this and the preceding ſtate, are not otherwiſe diſeaſed than by the thickening of its lining. In the *fourth*, the paſſage from the ſacculus lachrymalis into the noſe is totally obliterated, the inſide of the former being either ulcerated or filled up with a fungus, and attended ſometimes with a caries of the bone underneath.

In the firſt and moſt ſimple ſtate of the diſeaſe, viz. that of mere obſtruction without inflammation, much pains have been taken to reſtore the parts to their natural ſtate and uſe, without making any wound or diviſion at all. The introduction of a probe, the injection of aſtringent fluids, and a conſtant compreſſion made on the outſide of the ſacculus in the corner of the eye, are the principal means by which this has been attempted.

Several years ago, M. Anel made a probe (fig. 27) of ſo ſmall a ſize as to be capable of paſſing from the eyelid into the noſe, being introduced at one of the puncta lachrymalia, and paſſing through the ſacculus and duct; with which probe he propoſed to break through any ſmall obſtruction which might be found in its paſſage. He alſo invented a ſyringe (fig. 28), the pipe of which is ſmall enough to enter one of the puncta, and thus furniſhes an opportunity of injecting a liquor into the ſacculus and duct; and with theſe two inſtruments he pretended to be able to cure the diſeaſe whenever it conſiſted in obſtruction merely, and the diſcharge was not much diſcoloured. The firſt of theſe, viz. the paſſage of a ſmall probe through the puncta, has a plauſible appearance; but will, upon trial, be found very unequal to the taſk aſſigned it: the very ſmall ſize of it, its neceſſary flexibility, and the very little reſiſtance it is capable of making, are manifeſt deficiencies in the inſtrument; the quick ſenſation in the lining of the ſac and duct, and its diſeaſed ſtate, are great objections on the ſide of the parts, ſuppoſing it were capable of anſwering any valuable end, which it moſt certainly is not.

That the paſſing a fine probe from one of the puncta lachrymalia into the noſe is very practicable, we know from experience; but the pain it gives, and the inflammation it often excites, are much greater than any benefit which does or can ariſe from it. It is ſaid that the principal uſe of this probe is to clear the little ducts leading from the puncta into the ſacculus, and the obſtruction of thoſe ducts is often mentioned as a part of the diſeaſe. Hence one would be led to ſuppoſe that it was a circumſtance which frequently occurred; whereas it is ſeldom, if ever, met with. Nor, even if it did happen, could it ever produce the diſeaſe in queſtion; the principal characteriſtic of which is a diſcharge into the inner corner of the eye upon preſſure made in the angle.

The ſyringe, if uſed judiciouſly while the diſeaſe is recent, the ſac very little dilated, and the mucus perfectly clear, will ſometimes be found ſerviceable; it gives no pain; and a few trials render the uſe of it by no means troubleſome. There is very little occaſion, however, to take much trouble, or to put the patient to ſo much uneaſineſs; for if the ſac be emptied by compreſſion, if the liquor which was to have been injected be applied to the puncta, they will abſorb it as readily as the fluid which naturally paſſes through them.

Fabricius ab Aquapendente invented an inſtrument, which was ſo contrived as by means of a ſcrew to make a preſſure externally on the lachrymal bag; from the uſe of which, he ſays, his patients received much benefit. This inſtrument has been conſiderably improved by later practitioners, and is ſtill recommended as very uſeful. See Plate II. fig. 30.

All the good that can be obtained by compreſs and bandage, this ſcrew is capable of procuring; but it is alſo ſubject to all the ſame inconveniences, ariſing from the impoſſibility of determining exactly the due degree of preſſure: for if it be ſo great as to bring the ſides of the upper part of the ſac into contact, all communication between it and the puncta will thereby be ſtopped; if it be but ſlight, the accumulation will not be prevented; nor does it in either caſe contribute to the removal of the obſtruction in the naſal duct, the primary and original cauſe of the diſeaſe. If the curative intention were to procure an union of the ſides of the ſacculus, as in the caſe of parts ſeparated from each other by the formation of matter or ſloughs, and the preſſure could be made uniformly and conſtantly, poſſibly it might be ſo managed as to anſwer a valuable purpoſe; but as that is not the intention, the preſſure, whether made by an inſtrument or by a common roller and compreſs, contributes little or nothing towards a cure.

When the diſeaſe is only *beginning to form*, if the lachrymal ſac be frequently preſſed with the finger, the contents of it will be diſcharged before they become acrid, and the complaint, though ſeldom to be cured in this manner, may be ſometimes endured without any other aſſiſtance. But when the diſeaſe has advanced ſo far as to be in a *ſtate of inflammation*, conſiderable relief may be obtained from ſuch remedies as are found to be uſeful in inflammatory affections of other parts of the body, as blood-letting, laxatives, and low diet, together with ſaturnine applications, to the parts affected. But when theſe fail, and it is found that the paſſage of the tears to the noſe is completely obſtructed, as the matter, if it does not burſt outwardly, may be in danger of corroding the bone underneath, a different practice is to be followed.

In this ſtate, an *opening* in the upper part of the ſacculus lachrymalis becomes in general abſolutely neceſſary; and as a wound made by a knife leaves a much leſs diſagreeable ſcar than that which neceſſarily follows the burſting of the ſkin, one being a mere ſimple diviſion, the other a loſs of ſubſtance; it will always be found beſt to anticipate the accident of burſting, by making the opening as ſoon as the integuments are in ſuch a ſtate as to threaten it.

For *making this inciſion*, authors have been very particular in their directions with regard to its place, manner, and form. But all that the ſurgeon need obſerve is, to take care to keep the knife at a proper diſtance from the juncture of the palpebræ, to begin the inciſion a very little above a line drawn from that juncture toward the noſe, and to continue it downward ſo as to lay the ſac completely open; and the beſt inſtrument to make it with is a ſcalpel of the common form, but of a ſmall ſize. If the ſacculus be already burſt, the place of opening is determined; and the orifice may be enlarged with a knife, or dilated.

The inciſion being made, the contents of the tumor ſhould be moderately preſſed out; after which, ſome practitioners adviſe that the naſal duct ſhould be ſearched for by means of a probe; and if found, that a piece of catgut, bougie, or lead, ſhould be introduced, and kept there, its edge being bent a little downwards till the ſides of the duct are ſkinned over and healed. In the mean time, the ſore is to be dreſſed with ſimple pledgets of wax and oil, which are to be retained by means of adheſive plaſter. As ſoon as the paſſage of the tears into the noſe is ſufficiently ſecured, the ſubſtance which has been left in it is to be withdrawn, and the wound healed.

The *laſt ſtage* of this diſorder is that in which the natural paſſage from the ſacculus to the noſe is ſo diſeaſed as to be quite obliterated, or in which the bones are ſometimes found to be carious. The methods hitherto deſcribed have all been calculated to preſerve the natural paſſage, and to drive the lachrymal fluid again through it. In this attempt they are ſometimes ſucceſsful; but when every trial for diſcovering the naſal duct has been unſucceſsful, recourſe muſt be had to an artificial opening for the tears. In performing this part of the operation, the patient ſhould be ſeated oppoſite to a window, with his head ſupported by an aſſiſtant. The ſurgeon is to place himſelf immediately before him, either in a ſitting or ſtanding poſture. The canula of the trocar (Plate I. fig. 31) is now to be introduced to the under and back part of the lachrymal ſac, and held with one hand, while the ſtilette is to be paſſed into it by the other, in a direction obliquely downwards and inwards, between the two ſpongy bones, till it reach the cavity of the noſe, which will be known by ſome bloody mucus paſſing out at the noſtril. As ſoon as the inſtrument has penetrated the noſe, the opening ſhould be made ſufficiently large; then the ſtilette ſhould be withdrawn, and a bit of catgut or bougie, or what is more cleanly and convenient, a leaden probe, is to be introduced, and the canula removed. One end of the probe ought to remain in the noſe, and the other bent in ſuch a way as to hang over the edge of the wound, and at the ſame time be in no danger of coming out. The ſore is now to be covered with a pledget of lint ſpread with emollient ointment, and the whole retained with adheſive plaſter. The probe muſt be removed every day or two, ſo as to allow it and the paſſage to be cleaned; and at each dreſſing ſome aſtringent injection ſhould be thrown in, when the parts are to be dreſſed as at firſt. Several weeks will commonly be neceſſary for rendering the paſſage perfectly callous: but this muſt depend much upon the ſtate of the parts, as well as the conſtitution of the patient.

After the paſſage is become ſufficiently firm, the dreſſings and probe are to be withdrawn, and the parts cleared from any mucus with which they may be ſtuffed. The ſides of the wound, now already ſufficiently contracted, are to be laid together, and covered with ſome adheſive plaſter. If this be ineffectual, the wound is to be touched with cauſtic, when the cure will generally be quickly completed. To give tone to the parts, moderate preſſure ſhould frequently be made upon the ſac, either by the patient's finger or by the machine already mentioned, and this ſhould be continued for a conſiderable time. Sometimes the diſeaſe returns after a cure has been made, owing to diſeaſes of the conſtitution, carious bone contiguous to the ſore, or ſometimes to too ſmall an opening having been formed. In this caſe, a canula of gold, ſilver, or lead, is ſometimes introduced into the artificial paſſage, and the ſkin healed over it; by which means the paſſage will afterwards remain completely open, and no diſeaſe of the conſtitution can ever affect it. We ſhall deſcribe Mr. Pellier's method of performing this operation, as he made ſeveral improvements on it.

The patient is to be ſeated, and his head properly ſupported by an aſſiſtant; then the ſac is to be laid freely open at its inferior part: the naſal duct is to be ſearched for with a firm probe, or with a conductor (fig. 32), made for the purpoſe; and Pellier aſſerts that he never fails of finding it. As ſoon as this is diſcovered, a conical tube (fig. 33), with a projection at the top, and another in the middle for ſecuring it in its place, muſt be put upon the conductor, previouſly furniſhed with a compreſſor (fig. 34), and it ſhould be of ſuch a ſize that the conductor may fit it exactly. The point of the conductor is now to be paſſed into the lachrymal duct; and being puſhed in till it reaches the noſtril, which may be known either by inſerting a probe into it, or by a few drops of blood falling from the noſe, the conductor is to be withdrawn; leaving the compreſſor upon the brim of the canula, which muſt be firmly preſſed down with the left hand, while the conductor is removed with the other. This being done, the compreſſor muſt next be taken out; and to diſcover whether the canula be at a proper depth, a little milk or water ſhould be injected through it. If the injection paſs, it will ſhew that the canula is properly placed. If, on the contrary, any obſtruction occur, there will be reaſon to ſuſpect that it is already puſhed too far, and that it preſſes againſt the os ſpongioſum inferius; in which caſe the canula muſt be withdrawn, ſhortened, and re-introduced as before.

The ſore ought to be kept open for eight or ten days after the operation with ſoft lint ſpread with emollient ointment, and the whole covered with a compreſs of ſoft linen ſecured with a bandage. An injection of milk and water ſhould be daily paſſed through the canula; and as ſoon as the ſore looks clean and healthy, the dreſſings ſhould be entirely removed, and a piece of court-plaſter laid over it. In this ſtate it is to be left to heal; but the plaſter muſt be renewed, if matter appear to form beneath it. By this method Mr. Pellier finds, that fiſtula lachrymalis, not depending upon diſeaſes of the contiguous bones or of the conſtitution, may commonly be completely cured in two or three weeks, which, by the uſual practice, might require ſeveral months.

We have thus far ſpoken of this diſeaſe, and its treatment, as ſuggeſted by the eminent men whoſe names have occurred; we have now, however, to introduce to the reader's notice a valuable improvement in the treatment by Mr. Ware, who, in page 26 of his treatiſe on the Fiſtula Lachrymalis, deſcribes his method of cure in the following way:

" When the operation is determined on, the following is the mode in which I would recommend it to be performed:—If the diſeaſe has not occaſioned an aperture in the lachrymal ſac, or if this aperture be not ſituated in a right line with the longitudinal direction of the naſal duct, a puncture ſhould be made into the ſac, at a ſmall diſtance from the internal juncture of the palpebræ, and nearly in a line drawn horizontally from this juncture towards the noſe, with a common ſpear-pointed lancet. The blunt end of a ſilver probe, of a ſize rather ſmaller than the probes that are commonly uſed by ſurgeons, ſhould then be introduced through the wound, and gently, but ſteadily, puſhed on in the direction of the naſal duct, with a force ſufficient to overcome the obſtruction in this canal, and until there is reaſon to believe that it has freely entered into the cavity of the noſe. The poſition of the probe, when thus introduced, will be nearly perpendicular; its ſide will touch the upper edge of the orbit; and the ſpace between its bulbous end in the noſe and the wound in the ſkin will uſually be found, in a full-grown perſon, to be about an inch and a quarter, or an inch and three-eighths. The probe is then to be withdrawn, and a ſilver ſtyle of a ſize nearly ſimilar to that of the probe, but rather ſmaller, about an inch and three-eighths in length, with a flat head like that of a nail, but placed obliquely, that it may ſit cloſe on the ſkin (ſee a front and ſide view of this inſtrument, fig. 104, Plate V.), is to be introduced through the duct, in place of the probe, and to be left conſtantly in it. For the firſt day or two after the ſtyle has been introduced, it is ſometimes adviſable to waſh the eye with a weak ſaturnine lotion, in order to obviate any tendency to inflammation which may have been excited by the operation; but this in general is ſo ſlight, that I have rarely had occaſion to uſe any application to remove it. The ſtyle ſhould be withdrawn once every day for about a week, and afterwards every ſecond or third day. Some warm water ſhould each time be injected through the duct into the noſe, and the inſtrument afterwards replaced in the ſame manner as before. I formerly uſed to cover the head of the ſtyle with a piece of diachylon-plaſter ſpread on black ſilk; but have of late obviated the neceſſity of applying any plaſter, by blackening the head of the ſtyle with ſealing-wax.

" The effect produced by the ſtyle, when introduced in the way above mentioned, at firſt gave me much ſurpriſe. It was employed with a view ſimilar to that with which Mr. Pott recommends the introduction of a bougie, viz. to open and dilate the naſal duct, and thus to eſtabliſh a paſſage, through which the tears might afterwards be conveyed from the eye to the noſe. I expected, however, that whilſt the ſtyle continued in the duct, the obſtruction would remain; and of courſe that the watering of the eye, and the weakneſs of the ſight, would prove as troubleſome as they had been before the inſtrument was introduced. I did not imagine that any eſſential benefit could reſult from the operation until the ſtyle was removed, and the paſſage thereby opened. It was an agreeable diſappointment to me to find that the amendment was much more expeditious. The watering of the eye almoſt wholly ceaſed as ſoon as the ſtyle was introduced; and in proportion as the patient amended in this reſpect, his ſight alſo became more ſtrong and uſeful. The ſtyle, therefore, ſeems to act in a two-fold capacity: firſt, it dilates the obſtructed paſſage; and then, by an attraction, ſomewhat ſimilar to that of a capillary tube, it guides the tears through the duct into the noſe.

" The wound that I uſually make into the ſac, if the ſuppurative proceſs has not formed a ſuitable aperture in this part, is no larger than ſufficient to admit the end of the probe or ſtyle; and this, in general, in a little time, becomes a fiſtulous orifice, through which the ſtyle is paſſed without occaſioning the ſmalleſt degree of pain. The accumulation of matter in the lachrymal ſac, which, previous to the operation, is often copious, uſually abates ſoon after the operation has been performed; and, in about a week or ten days, the treatment of the caſe becomes ſo eaſy, that the patient himſelf, or ſome friend or ſervant who is conſtantly with him, is fully competent to do the whole that is neceſſary. It conſiſts ſolely in withdrawing the ſtyle two or three times in the week, occaſionally injecting ſome warm water, and then replacing the inſtrument in the ſame way in which it was done before.

" It is not eaſy to aſcertain the exact length of time that the ſtyle ſhould be continued in the duct. Some have worn it many years, and, not finding any inconvenience from the inſtrument, are ſtill afraid and unwilling to part from it. Others, on the contrary, have diſuſed it at the end of about a month or ſix weeks, and have not had the ſmalleſt return of the obſtruction afterwards.

" The troubleſome ulcerations, which are ſometimes formed over the lachrymal ſac, heal, in general, as an opening is eſtabliſhed through which the tears may paſs into the noſe. But in two inſtances which lately came under my care, in which the patients had occaſionally been ſubject to violent cutaneous eruptions, theſe wounds did not heal ſo ſoon as I expected; and a conſiderable quantity of purulent matter was diſcharged through the aperture that had been made to admit the ſtyle, ſeveral days after the operation was performed. Both theſe caſes were evidently relieved by adminiſtering internally a weak ſolution of the hydrargyrus muriatus, together with a light preparation of the Peruvian bark; and by purſuing the uſe of theſe medicines, the wounds in a ſhort time cloſed; the aperture, which had been made with the lancet contracted into a fiſtulous orifice, juſt large enough to admit the end of the ſtyle, and the purulent diſcharge wholly ceaſed.

" The poſition both of the probe and ſtyle is very nearly the ſame, whether they be paſſed through the natural naſal duct, or through a perforation in the thin part of the os unguis; and I have reaſon to believe that it does not eſſentially ſignify in which of theſe ways the operation is performed. It may be proper, however, to point out a few circumſtances in which the two operations appear to differ. One is, that in conſequence of the naſal duct being lined with a ſmooth membrane, the inſtrument uſually paſſes through it with facility; and its paſſage is unaccompanied with that ſenſation of a forcible breach, which is perceived by the operator when it makes its way for the firſt time through the ſubſtance of the os unguis. Another is, that when the inſtrument has paſſed through the naſal duct, it has nearly a perpendicular poſition with reſpect to the uſual poſture of the body, whereas, when it has paſſed through the os unguis, it has an oblique direction downward and inward. A third difference is, that in the former inſtance, the inſtrument is more firmly fixed than it is in the latter, in which it often has an unſteady motion when touched with the finger. By an attention to theſe hints, I think it may be diſcovered, with tolerable certainty, in which of the two ways the inſtrument has paſſed; and, I believe, I may venture to add, that whether the ſtyle be introduced in the former or latter of theſe directions, it is equally able to conduct the tears into the noſe, and to accompliſh a cure of the diſorder."

Mr. Ware, in the outſet, repreſents this diſcovery as founded on the improvement of the operation by Mr. Wathen, who employed a ſilver canula, which, inſtead of being paſſed through the os unguis, was worn in the duct. Inconveniences, however, reſulted even from Mr. Wathen's treatment, and theſe appear to have been obviated by the uſe of the ſtyle in ſeveral caſes related by Mr. Ware.—We ſhall lay before the reader the laſt of theſe, drawn up by Mr. Green, ſurgeon at Peckham, in compliance with Mr. Ware's requeſt, for inſertion in his treatiſe.

"Mrs. S., in the year 1793, was ſuddenly attacked with an apoplectic fit, whilſt ſtanding at the top of a flight of ſtairs; in conſequence of which ſhe fell down ſeveral of them, and by the fall one of her teeth was beat out, and the left ſide of her face much bruiſed. She ſoon recovered her recollection; but, for a conſiderable time afterwards, was deprived of the uſe of her limbs on that ſide. The ſight of the left eye alſo became dim; her left noſtril was peculiarly dry; and ſhe had frequent troubleſome itchings in the left eyelids. In the beginning of the year 1795, ſhe caught cold by going on the water; in conſequence of which the left eye and eyelid became inflamed, and a tumor began to form about the middle of the under lid, attended with a hardneſs nearly reſembling that of a ſtone. The inflammation extended over the lachrymal ſac, and the whole of that ſide of the noſe; and the paſſage for the tears was ſo entirely ſtopped, that this fluid trickled continually down the cheek. By the uſe of fomentations and poultices, together with the adminiſtration of cicuta, &c. the tumor was at length brought to a ſuppuration, and burſt. The edges of the ſore, however, were very hard, and had an unpleaſant carcinomatous appearance. She ſtill ſuffered violent excruciating pain; and her diſtreſſes were much increaſed by her being at that time between ſeven and eight months advanced in her pregnancy. In this ſtate of the caſe Mr. Ware viſited the patient with me on the 28th of March. We enlarged the aperture with a narrow-bladed curved knife, and carried the inciſion into the lachrymal ſac. A few days afterwards, I attempted to paſs a thin bougie through the ductus ad naſum; but the wound was in ſuch an irritable ſtate, that I was obliged to deſiſt without accompliſhing the object I had in view; and, although the patient had experienced relief from the violence of the pain ſhe before endured, by the enlargement of the aperture, the wound had ſtill a very unfavourable aſpect, and the tears continually trickled down the cheek. About the end of April, 1795, the operation Mr. W. propoſed was performed. The old wound being contracted in ſize, and ſituated in the inferior part of the lachrymal ſac, an aperture was made into this cavity with a ſpear-pointed lancet directly over the entrance of the naſal duct; immediately after which the end of a nail-headed ſtyle was introduced into the aperture, and conveyed through the duct into the noſe. From this time the wound put on a more favourable aſpect, and the tears paſſed through their natural courſe. The ſtyle was withdrawn every ſecond or third day, and ſome warm water injected. The old wound was dreſſed, as was deſired, with the ceratum album, mixed with a third part of the flores zinci; and its edges were occaſionally touched with the lunar cauſtic. Mrs. S. was brought to bed in June, and had an eaſy natural labour. Being afterwards in a very weak ſtate, ſhe returned to the uſe of bark and cicuta; and the old wound did not completely heal until the end of the year. The watering of the eye, however, totally ceaſed ſoon after the ſtyle was introduced; and at the preſent time, which is two years ſince the operation was performed, ſhe continues perfectly well. There is not the ſmalleſt hardneſs in the eyelid; the ſcar is very little perceptible; and as to the ſtyle, ſhe ſcarcely thinks it an inconvenience."

We refer the reader to Mr. Ware's treatiſe for many excellent remarks on this diſeaſe, which the limits of our work do not permit us to notice.

CHAP. XV. OF AFFECTIONS OF THE NOSE.

SECT. I. *Of* HEMORRHAGIES *from the* NOSE.

WHEN the means mentioned for this complaint under MEDICINE have failed, recourſe muſt be had to *compreſſion*. Doſſils of lint introduced into the noſtrils are ſometimes effectual; or the gut of ſome ſmall animal, tied at one end, then introduced by a probe into the noſe as far as the pharinx, and filled with cold water, or that and vinegar, and ſecured by a ligature, by adapting itſelf to all the parts, and preſſing equally on them, has been attended with advantage. When theſe remedies likewiſe fail in their effect, a piece of catgut or wire may be introduced through the noſe into the throat, and brought out at the mouth; a piece of ſponge, or a bolſter of lint of a ſize ſufficient to fill the back-part of the noſtril, is then to be fixed to it; the ſponge is next to be drawn back and properly applied. Another is to be applied to the anterior part of the noſtril and ſecured. The ſame may be done to the other noſtril, if it be neceſſary; or the ſponge may be of ſuch a ſize as to fill the ends of both noſtrils at the ſame time. By this contrivance the blood, not finding an outlet, will ſoon coagulate, and prevent any further evacuation.

SECT. II. *Of the* OZÆNA.

By this is underſtood an ulceration within the noſe, which may be occaſioned by external violence, by an expoſure to cold, by irritating ſubſtances, or by whatever produces inflammation in the membrane lining the noſtrils. Sometimes it ariſes from venereal infection; and in this caſe the diſcharge becomes ſo acrid as to corrode, and produce caries in the bones of the noſe. When the diſeaſe is local, and not depending upon any conſtitutional affection, aſtringent ſolutions are found to be the moſt uſeful, ſuch as a decoction of bark, or that mixed with alum. Doſſils of lint dipped in theſe are to be introduced into the noſtrils three or four times a-day; or ſome prefer the injection of ſuch fluids by means of a ſyringe as being more effectual. If ſtronger aſtringents be neceſſary, a ſolution of ſublimate ought to be uſed. At bed-time an ointment prepared with zinc or lapis calaminaris ought likewiſe to be applied, and a bliſter to the temple. A decoction of *water-dock root*, internally, has cured the diſeaſe.

Inſtances, however, occur, where the diſcharge is occaſioned by a collection of matter within the antrum maxillare; and then it is apt to reſiſt every effort till a proper outlet be given to it.

When the complaint is owing to venereal infection, the primary diſeaſe is to be attended to, and mercurial preparations are to be applied to the part; but when the bones are carious, till theſe are removed we need neither expect that the diſcharge will ceaſe, nor the diſeaſe be otherwiſe completely cured.

SECT. III. *Of* IMPERFORATED NOSTRILS.

Sometimes the noſtrils are in part or entirely obliterated. This may be owing to burns; ſmall-pox; different kinds of ſores, eſpecially thoſe of a venereal nature; and ſometimes it is the effect of original conformation, for it has been obſerved in new-born children.

When any opening exiſts in the obſtructed noſtril, it may be readily dilated by the introduction of a furrowed probe, and then cutting upon it in the courſe of the adheſion: but when no paſſage appears, the operator muſt endeavour, by means of a ſcalpel, to diſcover one of the noſtrils; and when diſcovered, it muſt be enlarged by a director and biſtoury, as in the former caſe. The other noſtril is to be treated in the ſame manner. After the openings are formed, they might be preſerved of a proper ſize by the introduction of doſſils of lint, which ſhould be frequently cleaned or renewed; but metallic tubes anſwer the purpoſe better, and allow the patient to breathe freely through them till a cure is performed. Previous to their introduction, they ought to be covered with ſoft leather ſpread with emollient ointment, and retained till the ſores are completely healed.

CHAP. XVI. OF AFFECTIONS OF THE MOUTH AND THROAT.

SECT. I. *Of the* DIVISION *of the* PAROTID DUCT.

WHEN the parotid duct is divided, the ſaliva which it tranſmits paſſes over the cheek inſtead of going into the cavity of the mouth. When the ſurgeon is called to a recent diviſion of the duct, he ought to lay the divided ends of it as exactly together as poſſible, and to retain them in their ſituation till they are united, by adheſive plaſters, or by the twiſted ſuture if there be conſiderable retraction of the parts. But when the portion of the duct next the mouth is entirely obliterated, an artificial paſſage muſt be made into the mouth, and an union formed between the opening and that part of the duct which proceeds from the parotid gland. The artificial paſſage ought to be as much as poſſible in the direction of the natural duct. For this purpoſe a perforation of a proper ſize is to be made obliquely into the mouth with the trocar (Plate II. fig. 35), from the ſide of the wound exactly oppoſite and contiguous to the under extremity of the upper portion of the duct; and then a piece of leaden probe of the ſize of the perforator ſhould be introduced by means of the canula, and be kept in the cheek till the ſides of the opening become callous; when, the lead being withdrawn, the extremities of the artificial and natural ducts are to be brought into contact, and retained there by adheſive plaſter till the cure is completed. Another method has, in a few inſtances, been followed by Mr. Latta (ſee his *Syſtem of Surgery*), of introducing one end of a bit of catgut into the artificial opening, and bringing it out at the mouth, while the other is introduced a little way into the extremity of the natural duct, and retained by adheſive plaſter till the wound is healed. Whichever way the operation is done, the patient ſhould live upon ſpoon-meat, and make as little motion as poſſible with his lips or jaws.

SECT II. *Of the* HARE-LIP.

The hare-lip is a fiſſure in the upper lip, very ſeldom in the under one. It is attended with want of ſubſtance, and has its name from a reſemblance to the lip of a hare. In general it is only a ſimple fiſſure, though ſometimes it is double; in which caſe it renders a cure more difficult to be executed. There are many lips where the want of ſubſtance is ſo great, that the edges of the fiſſure cannot be brought together, or at leaſt where they can but juſt touch, and then the attempt ſhould be forborne. It is likewiſe improper in infants, and ought not to be performed till ſeveral months after they have been weaned, when they will have acquired more ſtrength to undergo the operation, and will be leſs liable to be attacked with bowel complaints, which frequently make them cry at an earlier period of infancy.

In proceeding to the *operation*, the patient, if a child, ſhould be ſecured upon a perſon's knee, or rather perhaps upon a table; but if an adult he is to be ſeated upon a chair, in a proper light. The frænum connecting the gums to the upper-lip is to be divided; if a fore-tooth project ſo much as to prevent the parts from being brought properly together, it is to be extracted; or when the fiſſure runs through the bones of the palate, if a ſmall portion of the bone project, this muſt be removed. Matters being ſo far adjuſted, the operator is to lay hold of one ſide of the fiſſure between the thumb and forefinger, or between the forceps (fig. 36), then with a pair of ſharp and very ſtrong crooked ſciſſars, or with a ſcalpel, to cut off a thin portion of the lip, and to repeat the ſame thing upon the other ſide of the fiſſure, ſo as to render the whole edges of the fiſſure completely raw; by which, if the operation be properly performed, a piece will be ſeparated in form like an inverted V. After the inciſions have been made, the veſſels ſhould be allowed to bleed freely to prevent inflammation; and when the bleeding has ceaſed, the ſides of the wound are to be brought accurately together, and kept in that ſtate by the twiſted ſuture. The firſt pin ought to be as near as poſſible to the under edge of the lip; another is to be inſerted near the upper angle; and if the patient be an adult, a third pin will generally be neceſſary, half way between the other two. In paſſing them, they ought to go rather deeper than half through the lip, that the edges of the wound may be kept properly in contact. An aſſiſtant now keeps the parts together, while the operator applies a firm waxed ligature firſt to the under pin; and having made three or four turns with it in the form of an 8 figure (fig. 37), it ſhould then be carried about the ſecond, and in a ſimilar way about the third, care being taken that the thread be drawn of a proper tightneſs. After the ligature is ſecured, a piece of lint, covered with ſome mucilage, ſhould be laid over the wound to protect it from the air; and this is commonly all the bandage neceſſary. When, however, from a great want of ſubſtance, the retraction has been conſiderable, ſome advantage is derived from the uſe of adheſive plaſters applied to the cheeks and tied between the pins. During the time of the cure the patient ſhould be fed upon ſpoon-meat, and prevented from making any exertion with the lips, otherwiſe the cure will be conſiderably retarded. At the end of five or ſix days the pins may be taken out, when the parts will commonly be found completely united.

In the caſe of a *double hare-lip*, the operation ſhould be firſt done upon one fiſſure; and when a cure is completed there, it may be done ſafely upon the other.

SECT. III. *Of the* EXTIRPATION *of* CANCEROUS LIPS.

The under lip is much more frequently attacked with cancer than the upper, or indeed than any other part of the body. And as little dependence is to be placed upon external applications or internal remedies, recourſe muſt be had to the knife as the only certain method of cure.

When the diſeaſe has not attacked any conſiderable part of the lip, the diſeaſed part is to be cut out, the ſides brought together, and the wound cured by the twiſted ſuture. The operation ought therefore to be performed early, to allow the parts to be brought properly together. The general ſteps of the operation are nearly the ſame as in the operation for hare-lip, and therefore need not be repeated. It is only to be obſerved, that *all* the diſeaſed parts are to be removed, taking care to make the cut in ſuch a way as will moſt readily admit of the twiſted or hare-lip ſuture. When the parts can be brought together, the lip will have nearly the ſame appearance as in the operation for hare-lip; but when the diſeaſe ſpreads over a conſiderable part of the lip, ſo as to prevent the ſound parts from being united after the diſeaſed parts have been removed, all that can be done is to remove the parts affected, ſecure the bleeding veſſels, and dreſs the ſore like any other recent wound.

SECT. IV. *Of* AFFECTIONS *of the* TEETH.

1. *Dentition.*] In dentition the gums inflame and ſwell about the parts where the teeth are afterwards to appear; the child is continually rubbing the gums with its fingers; the ſaliva is commonly increaſed in quantity, though ſometimes the contrary happens: ſometimes the bowels are remarkably coſtive, though more frequently the reverſe: there is generally quick pulſe with heat, and other ſymptoms of fever; and on ſome occaſions theſe ſymptoms are attended with convulſions. The means found to be moſt uſeful here are ſuch as are moſt effectual in allaying irritation: as opiates, bliſters, and eſpecially warm-bathing. When theſe fail, cutting the gum by means of a fleme (fig. 48), over the approaching tooth, is frequently found to remove every ſymptom; but this ought to be done earlier than it commonly is, to have the full effect. Whenever the ſymptoms give reaſon to think that a tooth is approaching, the gums ſhould be cut freely over that part where the teeth may be firſt expected. When the ſymptoms recur, the operation ſhould be re-

peated. A crucial inciſion is attended with ſtill more effect; and the bleeding which afterwards takes place is of conſiderable ſervice. The inciſion ſhould always be carried as far as the tooth, which ought to be ſomewhat expoſed; and when properly done, is frequently followed with immediate relief. Sometimes the ſame kind of ſymptoms attend the cutting of the ſecond ſet, particularly of the dentes ſapientiæ. When this is owing to the thickneſs of the gums, ſcarifying gives the greateſt relief; but ſometimes it is for want of room in the jaw, and then the tooth ſhould be drawn.

2. *Derangement of the teeth.*] This happens more frequently in the ſecond than the firſt ſet, and more commonly in the fore than in the back teeth. This may be owing to the firſt ſet remaining in the jaw after the ſecond have appeared. Another cauſe is a want of ſpace in the jaw; and a third is a mal-conformation of the teeth, where they are too large in proportion to the jaw, and therefore overlap each other. The remedy is the ſame in each of theſe caſes, viz. to extract the teeth which ſtand in the way of the reſt, to allow thoſe which are out of their place to come into the row, and put on a more uniform appearance.

The uſual method of moving teeth which are out of the row is, by fixing them with a ligature to the neareſt teeth; or the ſame thing is done by metalline plates or pieces of wire. But theſe methods have not been found fully to anſwer the purpoſe intended, though in ſome caſes they may be uſeful When one or more front teeth are accidentally drawn out of the jaw, they ought to be immediately replaced. When the teeth are broken or otherwiſe injured, they may be ſupplied with others tranſplanted from the jaws of another perſon; but this can only be done when the ſockets have been newly emptied, for after inflammation comes on it is impracticable. In theſe caſes the inflammation muſt be allowed to ſubſide, and then artificial teeth can be readily adapted.

3. *Looſe teeth.*] When the teeth are *looſened by external violence*, by falls and blows, or by improper uſe of inſtruments in pulling diſeaſed teeth in the neighbourhood of ſound ones, they may again be made tolerably faſt by preſſing them as firmly as poſſible into their ſockets, and preſerving them ſo with ligatures of catgut, Indian weed, or waxed ſilk, and keeping the patient upon ſpoon-meat till they are firm. When looſe teeth are owing to tartar, nothing will faſten them till the cauſe be removed; and this ought to be done early, otherwiſe it will have no effect. Frequently the teeth become looſe from a ſpongineſs in the gums, often, but improperly, attributed to ſcurvy. The beſt remedy is ſcarifying the gums deeply, and allowing them to bleed freely; this ſhould be repeated till they are fully faſtened. Mild aſtringents, as tincture of bark, are here attended with good effects, though thoſe of an acid nature will certainly do harm. The mouth ſhould be frequently waſhed with cold water ſtrongly impregnated with theſe, and the patient

ſhould not uſe the teeth which have been looſe till they become firm again. The looſening of the teeth in old age cannot be remedied, as it is owing to a waſting of their ſockets, from which the teeth loſe their ſupport.

4. *Foul teeth.*] The teeth ſometimes become *yellow* or *black* without any adventitious matter being obſerved on them; at other times they become foul, and give a taint to the breath, in conſequence of the natural mucus of the mouth, or part of the food remaining too long about them. The moſt frequent cauſe of foul teeth is the ſubſtance called *tartar*, which ſeems to be a depoſition from the ſaliva, and with which the teeth are often almoſt entirely incruſted. When this ſubſtance is allowed to remain, it inſinuates itſelf between the gums and the teeth, and then gets down upon the jaw in ſuch a manner as frequently to looſen the teeth. This indeed is by far the moſt common cauſe of looſe teeth, and when they have been long covered with this or with any other matter, it is ſeldom they can be cleaned without the aſſiſtance of inſtruments. But when once they are cleaned, they may generally be kept ſo by rubbing them with a thin piece of ſoft wood made into a kind of bruſh, or with a bruſh of very ſtrong briſtles; after which the mouth is to be waſhed with common water.

Mr. Blanchet, of Quebec, has diſcovered, that an acid is formed near and round carious teeth. Being anxious for the preſervation of ſeveral of his teeth, which were waſting and crumbling away in the common manner, he undertook to find out, experimentally, the nature of the agent which thus preyed upon them. In the courſe of theſe trials, he became ſatisfied, repeatedly, that if he omitted for ſeveral days to clean his teeth, the fluid collected within their cavities, would turn the tincture of turnſole to a red colour: and, when carefully applied to the tongue, would excite a conſiderably ſour taſte. The ſaliva alone produces neither of theſe effects: nor is the tincture of turnſole reddened but in the fainteſt degree by the fluid if the teeth have been frequently waſhed. The acidity is inherent in the fluid only which is contiguous to the carious ſurface: it is not preſumed that it is the carbonic acid, for this would fly off in gas, in ſo warm a temperature as that of the human mouth. It was not derived from cider, porter, or acid drink, none having been taken. Mr. Blanchet thinks it is probably the ſeptic [nitric] or phoſphoric acid, or a mixture of both.

When the teeth are to be *cleaned by inſtruments*, the operator ought, with a linen cloth, or with a glove, to preſs againſt the points of the teeth, ſo as to keep them firm in their ſockets, with the fingers of the one hand, while he cleans them with the neceſſary inſtruments, fig. 41. No. 1, 2, 3, 4, 5, held in the other; taking care not to ſcrape them ſo hard as to looſen them, or to rub off the enamel. This being done, the teeth ſhould be rubbed over with a ſmall bruſh, or a piece of ſponge dipped in a mixture of cream of tartar and Peruvian bark. The ſame application may be made to the teeth for a few days, after which they may be kept clean as already directed.

The teeth are ſometimes covered with a thin dark-coloured ſcurf which has by ſome been miſtaken for a waſting of the enamel, but which is only an extraneous matter covering it. By perſeverance this may be cleaned off as completely as where the teeth are covered with tartar; but it is apt, after ſome time, to appear again. When this is obſerved, the ſame operation muſt be repeated.

For the purpoſe of applying powders or waſhes (which ought to be of the ſimpleſt and moſt innocent kind) to the teeth, a bruſh or a ſponge is commonly employed. The latter is ſuppoſed preferable, as being leſs in danger of wearing down the enamel, or of ſeparating the teeth; of this, however, there is, in fact, no danger. The uſe of the former hardens the gums and more certainly prevents the accumulation of tartar, and the ſtronger the briſtles of which the bruſh is made, and the more freely it is applied, even to the gums themſelves, the better.

5. *Tooth-ach.*] The cauſes producing this may be expoſure of the nerve of a tooth, by breaking or waſting of the enamel, inflammation in or about the tooth, or from ſympathy when diſtant parts are affected, as the eye, the ear, the ſtomach, or the uterus, as in time of geſtation. After tooth-ach has once been produced and removed, it is apt to return by expoſure to cold, by taking hot liquids, by hard bodies preſſed againſt the nerve in the time of chewing, by the uſe of a pick-tooth, &c.

With reſpect to the *cure* of this diſeaſe, no rule can be laid down which will anſwer with certainty upon all occaſions. No remedy has yet been diſcovered which will at all times even moderate the pain; relief, however, is frequently obtained from acrid ſubſtances applied to the tooth, ſo as to deſtroy the irritability of the nerve, ſuch as opium, ſpirit of wine, camphire, and eſſential aromatic oils. When theſe fail, bliſters behind the ear, or deſtroying the nerve by the cautious uſe of ſtrong acids, as half a drop of the nitric conveyed into the hollow of the tooth by the help of a ſmall camel's-hair pencil, will be found uſeful. A red-hot wire applied to the part, which is attended with only momentary pain, is generally a radical cure, and often ſucceſsfully practiſed by empirics.

When a black or decayed ſpot appears on a tooth, if it be quite ſuperficial, it may be removed; but if it go through the thickneſs of the enamel, it will be more adviſable to let it remain. Some dentiſts, however, cut out theſe black ſpots, ſhewing only the firſt ſigns of caries, and thus preſerve what remains of the tooth.

When a ſmall hole breaks out in a tooth, particular attention ſhould be paid to prevent the admiſſion of air. Tin, lead, or gold leaf, commonly employed for this purpoſe, ſometimes give relief for many months, or even years, if the ſhape of the cavity be favourable; but in other caſes theſe are of little advantage, and in ſome inſtances create great pain. When ſtuffing is to be employed, it ought to be done in the intervals of the fits of tooth-ach, otherwiſe it will give great uneaſineſs. When it is to be uſed, the whole cavity of the tooth ſhould be filled; and this is to be done with the inſtruments, fig. 42, No. 1, 2, 3, in Plate II.

In the Medical and Phyſical Journal is inſerted an account of a ſingular remedy for the tooth-ach. It is the well known inſect, called a *lady-cow* (*coccinella ſeptem punctata.* Linn.), which is to be bruiſed between the finger and thumb, and applied to the affected tooth; rubbing it alſo on the gum. It is even ſaid that a tincture made from theſe inſects will be attended with the ſame beneficial effects.

Dr. Handel, of Mentz, recommends the following remedy as a very powerful ſedative in tooth-ach, when occaſioned by corrupted or hollow teeth. Upon the application of it, the doctor ſays, the excruciating pain almoſt inſtantly ceaſes.

(No. 84.) ℞ Olei hyoſcym. ʒj.
Opii ʒſs.
Extract. belladon.
Camphoræ, aa gr. vj.
Olei cajeput.
Tincturæ cantharidum, aa gtt. viij.
Redigantur in formam opiatæ.

The following obſervations on odontalgia, with the explanation of an apparatus that has been employed in relieving it (ſee Pl. V.), are addreſſed to the Medical and Phyſical Journal, by Dr. Brown.

"The tooth-ach," ſays the doctor, "the moſt frequent and painful diſeaſe incident to the human body, is often occaſioned by being expoſed to a partial current of cold air, or to ſudden heat and cold; by reſiding in a marſhy or damp ſituation; by morbid matter within, by acrid matter attached to the external ſurface of the teeth, and frequently by the muſcles and membranes of the jaw being affected by the ſame diatheſis which produces irritation, gout, and rheumatiſm in other parts. Women are more liable than men to rheumatiſms and to tooth-ach; they are moſt ſubject to both in pregnancy and during obſtructions of the menſtrual diſcharge.

"It has alſo been obſerved, that mercurial preparations thrown into the ſyſtem, ſo as to affect the ſalival glands; nervous affections; ſipping hot liquors; frequent picking of the teeth with hard inſtruments; a ſcorbutic and ſome other acrimonious ſtate of the fluids; probably often occaſion a caries of the teeth: and I have known ſeveral families, who ſeemed particularly liable to their premature loſs and decay.

"Sir Hans Sloane gives an inſtance of the virtues of *ſemen hyoſciami*, in alleviating the tooth-ach. A perſon of quality, tormented with this racking pain, had an empiric recommended to him, who conveyed the ſmoke of burning ſeeds of henbane, by means of a funnel, into the hollow tooth, and thereby removed the pain; but, at the ſame time, there dropped ſome maggots from the tooth (as the operator pretended) into a pail of water placed underneath for that purpoſe. Sir Hans procured one of theſe maggots, which he ſent wrapt up to M. Lewenhoeck, at Delft in Holland, where it arrived ſafe and alive. Upon examination, M. Lewenhoeck found it to be entirely like thoſe bred in ordinary rotten cheeſe; wherefore he procured ſome of theſe latter, and carefully fed them both, and that one Sir Hans Sloane had ſent, on the ſame cheeſe; and they were all, according to the uſual methods of nature, turned into ſmall ſcarabei, both being returned ſuch to Sir Hans from Holland. Upon the whole, though the henbane ſeeds cured the tooth-ach, it is highly probable that the maggots had been conveyed thither, and let drop into the water by ſome ſlight of hand.

"We learn from the writings of Dioſcorides and others, that *hyoſciamius*, which is a powerful remedy of the narcotic tribe, has been employed as an anodyne by the moſt illuſtrious phyſicians, from the earlieſt periods of medical hiſtory. It appears to have been the favourite ſedative of Celſus; he gave it internally to mitigate pain and procure ſleep; he uſed it externally as a collyrium, in caſes of ophthalmia; and he employed it topically to aſſuage the pains of the teeth and gums. Accordingly, under the head of '*Dentium doloris varia remedia*,' he ſays, with his uſual eloquence and preciſion, 'The tooth-ach is a diſorder that may be juſtly ranked among the greateſt torments;' and he tells us, 'if the pain be ſevere, a clyſter is uſeful, with hot cataplaſms applied to the cheek, as alſo ſome medical hot liquor held in the mouth, and frequently changed. For which purpoſe is uſed, henbane root, either in vinegar and water or diluted wine, with the addition of a little ſalt to either of them, and poppy heads not over dry, and mandrake roots prepared in the ſame manner; but in theſe three, care muſt be taken not to ſwallow what is in the mouth.

"Mynſicht who has long been reſpectfully named in our diſpenſatories, gives, in his *Medico-Chymicum*, the following formula, which are all deſigned for the uſe of perſons afflicted with painful affections of the teeth and gums, viz. Tinctura Odontalgica, Pilulæ Odontalgicæ, inſerted in Dr. Lewis's Diſpenſatory, p. 330, 5th edit. Trochiſci de Alumine with radix Pyrethrum, Spiritus Odontalgicus; in all which he directs a certain portion of the ſeeds of henbane. Salmon, whoſe labours ſeem not to have been duly appreciated by his countrymen, and Etmuller, preſcribe them for the ſame purpoſe. Boerhaave had his ſenſes diſordered by only uſing a plaſter from this plant. Yet, as the various medicines I had myſelf hitherto employed were of little avail, and as I had ſome teeth extracted, and obtained in one inſtance only twelve hours' reſpite from my ſufferings, the pain flying either to another tooth, or attacking the *antrum maxillare*, I tried the effect of fumigating with the following:

(No. 85.) ℞ Sem. Hyoſcy. p. ij.
Sem. Carui
Sem. Cumin. aa. p. j. Miſce.

"After repeating the operation three times, I remained near a fortnight exempt from pain: I then had occaſion to have recourſe to the fumigation again, and was again relieved; and in the mean time a permanent cure was obtained by the uſe of internal medicines, which had never occurred either to myſelf or any of the many ſkilful and experienced practitioners who had been conſulted, on what appeared to ſome of them as a caſe equally inveterate and extraordinary."

In caſe of a carious tooth, extraction is often the only radical remedy; but as in ſome caſes extraction is improper, and as in many inſtances it is obſtinately avoided, Doctor Brown had a veſſel made of copper, of which ſee an engraving in Plate V. "The apparatus takes in pieces at the line *a b*, and alſo at *c*. The bottom is fitted into a wooden ſtand turned with a groove, to prevent its ſlipping out of the hand of the operator. In the centre of the bottom of this veſſel (as the tube at the bottom of a lanthorn for the reception of a candle) is a piece of metal ſhaped to receive the bowl of a *large* tobacco-pipe, with an opening large enough to receive the ſtalk of the pipe oppoſite to the hole at *b*. The apparatus being taken aſunder at *a*, *b*, the cup or bowl of an iron or common clay tobacco-pipe is made red hot, filled quickly with the ſeeds, placed in the aperture formed for its reception, the conical or upper part being reſtored to its place, as in the engraving; the tube *c* is turned upwards or downwards, as the pain may happen to be ſeated in the upper or lower jaw*; and being placed in contact with it, the operator, applying his mouth to the tube of the pipe, forces by his breath, into the mouth of his patient, the ſmoke of the burning ſeeds, which, by their heating, ſedative, and ſialagogue effect (ſometimes it being neceſſary to repeat the proceſs), generally afford the patient conſiderable relief."

6. *Tooth-drawing.*] When the remedies made uſe of for the removal of tooth-ach have failed in their effect, and it is found that the complaint ſtill continues, it will be neceſſary to *extract the tooth*. In doing this, it may be obſerved, that all the teeth may be pulled to either ſide, excepting the dentes ſapientiæ of the lower jaw, which ought to be pulled outwards, otherwiſe the jaw may be ſplintered. As ſoon as the ſocket is cleared of blood, if the tooth be not much ſpoiled, it may be boiled and replaced, when it will become nearly as uſeful as before. It is difficult, however, to replace the large

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* The ſmall tube marked *d*, is intended to be uſed when pain is ſeated in the front teeth.

grinders, on account of their diverging roots. The more perpendicularly the teeth are pulled, the leſs contuſion and injury will be done to the jaws and alveoli. But as no inſtrument has been invented capable of effecting this properly, ſurgeons are obliged to be contented with an inſtrument which acts in a lateral direction. The moſt uſual is that well-known inſtrument in form of a key, with a claw and fulcrum. Previous to the operation, this ſhould be covered with a linen rag, to prevent the gum from ſuffering. After dividing the gum, or ſeparating it from the tooth, the claw is to be fixed as deep between the teeth and gum as poſſible. Then the fulcrum is to be applied on the oppoſite ſide. The ſurgeon may now, with one turn of the handle of the inſtrument, pull the tooth out at once. But the turn ſhould not be effected by a ſudden jerk, but in the moſt cautious and ſlow manner. When it happens to be one of the great molares, whoſe roots diverge very much, and when they are firmly fixed, after only looſing it with the firſt pull, the claw of the inſtrument is to be applied to the other ſide of the tooth, and the turn given in a contrary direction to the firſt. After it has been ſufficiently looſened in this manner, it is to be laid hold of by a common teeth forceps (fig. 43), and extracted in the eaſieſt manner. Upon extraction of the tooth, any detached ſplinters occurring are to be immediately removed. Should any conſiderable hemorrhagy take place, the patient may take ſome cold water, vinegar, or ſpirit of wine, into his mouth, or doſſils of lint may be introduced over the ſocket. Should all theſe fail, recourſe muſt be had to the actual cautery.

When ſtumps occur from caries, or when the teeth have broken in time of the extracting, the common key will ſometimes remove them; if that fail, the punch (fig. 44) is to be uſed. The operator, having this inſtrument in one hand, is to place the fore-finger of the other, with a piece of cloth wrapped round it, upon the inſide of the jaw oppoſite to the ſtump, to protect the neighbouring parts.

To this account of the uſual means of performing this operation we propoſe to add the following remarks on the extraction of teeth, with a view to leſſen its danger; and the deſcription of a new ſcarificator, and an inſtrument for drawing teeth, communicated to the editors of the Medical and Phyſical Journal, by Dr. Dyce, of Aberdeen (ſee Pl. V.)

" Every perſon converſant in the operations of ſurgery," ſays Dr. Dyce, " knows how to extract teeth; but few, comparatively, who perform this operation, conſider the danger that attends it. If I wiſh to draw a nail (which having been retained for ſome time in a wall, and, by means of the oxygen contained in the atmoſphere, converted partly into an oxyde, nearly reſembles a carious tooth), I can extract it with the aſſiſtance of a common hammer, by fixing the nail between the claw; this is eaſily done, as the latter adapts itſelf to any ſize (being nearly the form of the letter V); then forcing the handle to one ſide, I thereby form a fulcrum on the edge of the hammer, or the ſide of the claw, and by the power which the long handle or level affords, I am enabled either to extract the nail, or perhaps to break it; but ſhould there be the leaſt appearance of ſo doing, I then immediately force the handle to the other ſide, and on taking another hold, the nail, in all probability, will come out complete or entire. Such is preciſely the caſe with regard to the drawing of teeth; for whenever the pull is too great to venture upon, by changing the claw of the inſtrument, and fixing it on the other ſide, the tooth being already looſened by the firſt attempt, a ſmall degree of force only will be requiſite to bring it to the other ſide, and it will then come out along with the inſtrument; yet never without ſome injury being done to the alveolar proceſs. To be convinced that this muſt be the caſe, we need only conſider the poſition of the hammer in pulling the nail, as it is more completely expoſed to view, both inſtruments being perfectly ſimilar in their application and principles. On the firſt attempt to pull, we find that the nail begins to bend to one ſide; an additional force brings it out a little, but in what direction? not in a ſtraight line, but in a curved one, forming a ſegment of the circle, which would be deſcribed by placing one leg of a compaſs at the fulcrum, or that part where the hammer reſts, and extending the other leg to the nail; then drawing a circle by means of this known radius, the nail when extracted, would exactly correſpond with a part of the circumference of the circle drawn. But as the human teeth do not bend, being different in their texture from that of the metal of which the nail is compoſed; and as the bed or ſocket in which they are lodged, is likewiſe different from the wood in which the nail is incloſed; it is not to be wondered at, that one or other of them will give way, conſidering the ſhort turn which the inſtrument muſt, from its conſtruction, deſcribe.

" Let us ſuppoſe the claw placed (either outſide or inſide) upon the tooth, with the point of it as near to the gum as poſſible, the reſt or fulcrum alſo being placed on the oppoſite ſide, as near to the jaw as may be without reſting upon it, then by taking hold of the handle of the inſtrument in the right hand, we give it a twiſt, which we ſhall ſuppoſe brings it out, yet ſo that one or other of the circumſtances already mentioned will take place, viz. the tooth broke and part of the fang retained in the cavity, and if ſo, the former complaints very often will continue, and ſometimes increaſe beyond endurance; or, if the tooth be whole, a conſiderable ſplinter of the alveolar proceſs will be brought out along with it.

" Theſe inconveniences, not to mention the great pain and dangerous conſequences that frequently enſue, have not paſſed unnoticed by profeſſional men, in every country where the key inſtrument has been in uſe; an inſtrument too well known to require a deſcription here, as no perſon capable of judging of its imperfections can be ignorant of its conſtruction. The inſtrument uſed a century ago for the ſame purpoſe does not materially differ from the one at preſent in uſe; it no doubt has undergone a variety of form, but the principle remains the ſame. Among the numerous attempts to improve it, the only one, not materially different from the old inſtrument, and which merits particular notice, is that propoſed by Mr. Savigny, ſurgical inſtrument maker, in London, and deſcribed in the 7th volume of ‘ Medical Facts and Obſervations.’ That gentleman has certainly heard many complaints, and is himſelf well qualified to judge of the imperfections of the old inſtrument, but the improvement which he wiſhes to introduce (conſiſting of a ſmall cylinder or bolſter on the end of the inſtrument, placed on the tooth as near to the proceſs as poſſible, the claw being fixed to the circumference of this cylinder) by no means performs what he intends or ſays, viz. ‘ the extraction of the tooth in nearly a perpendicular direction.’

“ A trial of the inſtrument is ſcarcely neceſſary to prove this; a ſimple inſpection of it only may ſuffice to convince us that the end propoſed is not here attained, and alſo that his inſtrument is not materially different from the common one, either in its direction, or power of action.

“ It is ſcarcely neceſſary to mention, that the only advantage which this inſtrument poſſeſſes over thoſe in common uſe, is the ſhort time that is required in changing the claw from one ſide of the tooth to the other; but this is not always neceſſary, and it is only an additional expence to the price of the inſtrument, without producing any advantage equivalent thereto. The principal objection to it, and the diſagreeable conſequences that enſue from the uſe of all other inſtruments, which have been contrived for extracting teeth, is certainly the following: the ſhort lateral turn or curve which the inſtrument deſcribes when in action. But how is this to be remedied? We can eaſily find out imperfections, and yet the means hitherto employed for the removal of them have not been attended with that ſucceſs which the importance of the object deſerved. All who have conſidered the common key inſtrument, or indeed any one with which we have been yet made acquainted, will agree, that the ſudden turn, deſcribed by the tooth or inſtrument while extracting, occaſions moſt of the inconveniences attending the operation: when this is known, the practitioner will naturally ſay to himſelf, the main thing required is to pull the tooth in a perpendicular direction, or rather in the direction of its axis; but when again we come to conſider how this is to be done, a queſtion occurs, what inſtrument can be uſed, which will have ſufficient power, and yet be applicable in ſo confined a ſituation? The ſolution of this ſeems inſurmountable.

“ We have already conſidered the inconveniences attending the uſe of the key inſtrument as commonly applied, by its ſuddenly turning the tooth to one ſide; what we have now to conſider is, whether it be poſſible to extract it in the direction of its axis, or in a perpendicular direction, and in what way? If we again conſider how the hammer is employed in extracting a nail in another direction, we ſhall at once conclude, that another inſtrument, or at leaſt one conſtructed on different principles, will be requiſite for that purpoſe. If I wiſh to pull the nail in a more perpendicular direction, fix it firſt in the claw, then by cauſing the end or ſolid part of the hammer to reſt upon the wall, I do not force it to one ſide, but pull exactly in the direction of the claw, by which means the nail is raiſed nearly in a perpendicular direction, or rather in the direction of a ſegment of the circle formed by the point of the claw of the hammer where the nail reſts, taking the ſolid part or other end of it, where the fulcrum is, for the centre. In nearly a ſimilar way, would I propoſe teeth to be extracted; the inſtrument, however, for this purpoſe will be beſt underſtood from the annexed drawing.

" A B, fig. 1, repreſents the inſtrument nearly of its proper ſize, and reſembles in a great meaſure the common ſtump forceps. Attached to the forceps at C is a ſemicircular piece of wood or metal, the under part of which is ſtuffed and covered with leather: this ſemicircular piece is ſo conſtructed that it may be ſlipped off at pleaſure, and a larger or ſmaller one adapted, as the caſe may require: whenever this inſtrument is to be uſed, it is requiſite, in the firſt place, to obſerve that there be no vacancy between the tooth to be extracted and the front teeth: then, having previouſly well ſeparated the gum from the tooth, the point of the inſtrument is to be applied on each ſide of the tooth as low down, and taking as firm a hold of it, as poſſible; then by depreſſing the handle, at the ſame time taking care not to loſe hold of the tooth, the ſemicircular piece reſts upon the anterior teeth, and forms a fulcrum, yet it produces a very different effect at the point of the inſtrument, which a common prop would do; for by means of it, the tooth, when raiſed, deſcribes, not the circle which would be formed by taking the diſtance between the point of the inſtrument and the fulcrum, but one that is of a much larger radius; which of courſe comes nearer the direction wanted, the perpendicular. I am well aware, that one great objection will be offered to the uſe of this inſtrument, and that is, in caſes where one, two, or three teeth are wanting, and where there is nothing to reſt upon but the gum. Even in ſuch caſes, this inconvenience may be eaſily obviated by having a flat piece of metal with a ſmall handle attached to the ſide; this flat piece being ſtuffed in the under ſide and covered with leather, ſhould be placed upon the gum; then the ſemicircle of the inſtrument reſts upon it as upon the teeth, and in this way the inſtrument may be uſed with as much facility in the one caſe as in the other.

" The force neceſſary to draw a tooth is not ſo great as one would be apt to imagine, provided the cords (if I may be allowed ſo to call the gum) be completely ſeparated from the tooth, which by the bye is ſeldom done by any operators. Indeed, moſt perſons that are in the practice of extracting teeth, complain of the difficulty of dividing the gum from the tooth completely; and a very eminent writer (Mr. Hunter) on this ſubject, ſays, ‘ It is a common practice to divide the gum from the tooth before it is drawn, which is attended with very little advantage, becauſe at beſt it can only be *imperfectly done*;’ and he adds, ‘ But if ſuch a ſeparation, as can be made, ſaves any pain in the whole of the operation, I ſhould certainly recommend it, and at leaſt, in ſome caſes, it might prevent the gum from being torn.’ Now what I wiſh to advance on this ſubject is, to endeavour to point out a method of performing this part of the operation *completely*; for the author above quoted certainly does not mean to affirm that it is uſeleſs, but only that the method at preſent in uſe does not anſwer the intention. If we examine any of the ſcarificators commonly uſed for the purpoſe, we ſhall ſoon be convinced that they cannot anſwer the end fully, and we ſhall find alſo that they are ſo conſtructed as not to admit of being applied exactly round the tooth; for, with all the care which we can poſſibly exert to go round the convexity of the tooth, ſtill there will be ſome part which cannot be come at. But, by ſubſtituting the following ſimple *ſcarificator*, all theſe defects will be completely remedied. D E, fig. 2, repreſents the inſtrument I propoſe, of its proper ſize; the handle at F unſcrews, and in it is contained three, four, or ſix blades, or ſcarificators, any one of which may be applied at pleaſure; for by unſcrewing the ſtem at G out of the knob K the blade H alſo unſcrews, and another of a different form may be ſubſtituted, and can be made *dead* faſt in any direction by means of the ſcrew at G ſo that it may be exactly adapted to the curvation of the tooth, and of courſe the gum ſeparated more completely than by any former ſcarificator. I repreſent blades of different forms; one form being found, on ſome occaſions, more convenient than another; and as any of them will fit the ſcrew at D they may be made faſt in any direction, by means of the ſcrew in the point of the ſtem at G.—K repreſents the ſmall button or end-piece unſcrewed from the ſtem, and without a blade.”

7. *Tranſplanting teeth.*] Teeth can never be *tranſplanted* with propriety in childhood or in old age. The conſtitution muſt be free from thoſe diſeaſes which affect the gums. The tooth to be tranſplanted muſt be taken from a perſon of a ſound conſtitution, otherwiſe it will convey infection. If the tooth fit the ſocket properly, there will be no occaſion for uſing a ligature to fix it; but if a ligature be found neceſſary, it may be made of threads of fine ſilk properly waxed. After the operation is finiſhed, the patient ought to avoid whatever may be in danger of ſhaking the tooth, and this is to be attended to till the tooth is perfectly firm. He ſhould alſo guard againſt cold and moiſt air, and live upon ſpoon-meat.

With theſe precautions, if the tranſfer of the tooth be *immediate*, there is no doubt but its living principle will be preſerved, and it will become a part of the perſon into whoſe jaw it has been conveyed. Mr. Hunter has written much on this practice, which, however, has been rendered ſomewhat dubious, by the inconvenient and even *fatal conſequences* which have unhappily attended it in certain inſtances. Some of theſe appear in the Memoirs of the Medical Society of London, from which we extract the following, by Dr. Lettſom:

"On the 23d of Auguſt, 1785," ſays the doctor, "I firſt viſited J. Y——, eſq. from whom I learned, that about two months before, he had had two of the central inciſores removed, and about a week afterwards, the right exterior inciſor, which were replaced by a celebrated dentiſt from two young women, who were ſuppoſed, by an eminent ſurgeon, to be perfectly healthy; after having made the moſt minute ſcrutiny to aſcertain the fact.

"For the ſpace of ſix weeks after the firſt operation, no inconvenience reſulted; but after this period, a painful ſenſation between the two firſt tranſplanted teeth came on; the patient, however, endured it for a week before he made application to the ſurgeon, who recommended him to take Peruvian bark and laudanum freely, which he continued to do for the ſpace of another week, when I was conſulted.

"When the painful ſenſation I have mentioned firſt excited the attention of the patient, he recollected that he had been out later than uſual, on the preceding evening, and imagining he had taken cold, he aſcribed the preſent ſymptoms to this cauſe, not having at this time any other motive of ſuſpicion; and the tranſplanted teeth had previouſly acquired nearly a natural firmneſs.

"During the uſe of bark and laudanum, for the week prior to my attendance, the pain continued, and an ulceration had taken place in the gums of the interior ſurface of the two firſt tranſplanted teeth, and gradually extended to the root of the right inciſor.

"I have already obſerved, that I viſited this gentleman eight weeks after the two central inciſores had been replaced: the day preceding my attendance, he had felt a ſlight ſoreneſs and ſwelling of the glands of the neck and throat, which were painful on preſſure, but no ulceration was perceptible in thoſe parts.

"I found an ulceration interiorly, extending about half an inch from the teeth, on the ſurface of the roof of the mouth; and longitudinally, the extent of the three teeth; the ulceration had an irregular jagged looſe appearance, with livid, ſphacelated interſtices. The external gums were alſo, but much leſs, ulcerated, and of a more clean, and leſs gangrenous aſpect; but the whole together was ſuch as would have given me the ſuſpicion of a venereal diſeaſe in any other ſituation. The teeth were become looſe, and particuſarly one of the central inciſores; the external one was by much the moſt firm.

"In other reſpects the gentleman was in a tolerable ſtate of health, of chaſte morals, and careful in his mode of living. He had very lately, before the operation, arrived from the Weſt Indies, and had not yet acquired the European vigour of health, though not in any ſtate of diſeaſe. Since the firſt ſenſation of pain, he complained of feveriſh heat, and underwent reſtleſs nights.

"At my firſt viſit I ordered him to take a grain and a half of opium, and two grains of calomel at bed-time; a draught every four hours, containing a drachm of bark, in powder, and a drachm and a half of Huxham's tincture of bark; and to ſprinkle the ulcerations with a powder of two grains of calomel, and ten of olibanum."

In a conſultation, on the 25th, with three ſurgeons of eminence, beſides the dentiſt, it was concluded to omit the mercurial, and to give a drachm and a half of cinchona, with ten drops of tincture of opium, in a neutral mixture, every four hours.

"Since the 23d," ſays Dr. Lettſom, "there was very little alteration in the ſymptoms, which, however, were in no reſpect aggravated.

Aug. 26th. "The ulcerations continue much the ſame; the pulſe is regular; an efflorescence for the firſt time appears on the ſkin: the ſame quantity of Peruvian bark was continued, with twelve drops of thebaic tincture in each doſe.

27th. "The ulcerations much as before, at leaſt there is no appearance of amendment. The remedies were continued.

28th. "The bark was with difficulty retained on the ſtomach; it was however continued, and four ounces of a decoction of ſarſaparilla ordered to be taken after each powder.

"The efflorescence on the ſkin is almoſt general; of an obſcure red colour, reſembling a ſyphilitic eruption in every reſpect, ſo far as I could aſcertain.

"The ulceration of the gums does not diminiſh: a lotion of one drachm of cauſtic alkali in half a pint of water, with half an ounce of gum-arabic, was directed to be frequently applied to the ulcerations.

Sept. 2d. "The ulcerations have not increaſed, but rather diminiſhed; the eruption on the ſkin is rather paler; an ulceration of the tonſils is now perceptible; the patient expreſſes relief from the uſe of the lotion; the teeth are very looſe.

8th. "The ulcerations of the gums are more extended, jagged, and ſphacelated; the ſtrength of the patient is greatly reduced; he complains of head-ach and want of reſt, with feveriſh heat in the evening, and profuſe ſweats in the morning. One eye is very much inflamed.

“ He was ordered to take a quarter of a grain of corroſive ſublimate twice a-day, and to apply to the ulcerations a ſolution of three grains of ſublimate in half a pint of water.

10th. “ The ulcerations increaſe; the teeth are ready to drop out of the ſockets, particularly the central inciſores; the ſublimate excites great uneaſineſs in the ſtomach, and is therefore omitted; both tonſils are become alarmingly ulcerated.

“ The patient expreſſes great diſlike to the uſe of mercurials, but is perſuaded to rub upon the legs one drachm of the ſtrong mercurial ointment daily, and to drink one pint of a decoction of ſarſaparilla.

12th. “ The complaints are not augmented; but if any alteration is perceptible, it is on the favourable ſide. The ointment and ſarſaparilla are continued.

19th. “ There is ſcarcely any efflorescence of the ſkin remaining; the ulcerations of the gums and tonſils are greatly diminiſhed: the *ophthalmia* is alſo leſſened, though there is ſome inflammation of the other eye.

22d. “ The ulcerations and the *ophthalmia* are nearly well; but as the ointment has not produced any ptyaliſm, it is continued, and the ſarſaparilla likewiſe. The teeth have acquired a tolerable degree of firmneſs.

26th. “ The ulcerations are perfectly healed, and every other ſymptom of indiſpoſition has vaniſhed; the teeth have acquired a greater firmneſs in the ſockets, and the remedies were allowed to be ſuſpended.”

Dr. Lettſom here obſerves, that ulcers depending upon ſyphilis, however difficult of deſcriptive elucidation, are in general pretty readily aſcertained from their peculiar aſpect; and from all the obſervations he was able to make, he did not heſitate in giving his opinion, that the diſeaſe deſcribed, was the *lues venerea* communicated by the tranſplanted teeth, which the appearances in the ulcers of the gums, the eruption on the ſkin, the peculiar *ophthalmia*, the ulcerations in the tonſils, and the whole progreſs of the treatment and cure, appeared to him to demonſtrate.

“ Under this perſuaſion,” ſays he, “ as the mercurials were ſuſpended as ſoon as the ulcers healed, and before the diſeaſe was probably totally eradicated, I intimated this ſuſpicion at the time, to the patient; whoſe ſtrength, however, was ſo far reduced, as authoriſed us to interdict mercury at preſent, eſpecially as he then propoſed to take the tour of the ſouthern parts of Europe. I recommended him therefore to procure mercurial ointment, prepared without turpentine, and in caſe of the recurrence of the diſeaſe, to have immediate recourſe to this remedy.

“ By the time he arrived at Genoa, which was on the 29th of December, about eight weeks after the ſuſpenſion of the mercurial ointment, the diſeaſe again appeared, with ulcerations of the gums, reſembling, as far as the patient could judge, the former attack, though in a leſs degree, owing probably to the immediate application of mercurial ointment to the throat, which in leſs than a week ſtopped the diſeaſe; after which he uſed it very ſparingly, and concluded his medical regimen with taking a decoction of ſarſaparilla; and he has ſince continued free from diſeaſe to the preſent time, May, 1786, when I procured his aſſiſtance in drawing up the preceding relation.

"Whilſt I admit the reſemblance of this diſeaſe to the *lues venerea*, I cannot be inſenſible of the weight of ſome general objections, publiſhed by a gentleman, whoſe great diſcernment is univerſally admired*; but as I have related the appearances and progreſs of the diſeaſe, the treatment and cure of it, from notes daily taken, my opinion cannot alter the facts, with which the author I have alluded to was acquainted, and of which the reader may decide upon for himſelf.

"I have remarked, that two teeth, the central inciſors, were inſerted a week before the external inciſor; and the diſeaſe throughout its whole progreſs, ſeemed to originate from the two former; both of which were very looſe, one indeed was ready to drop out of the *alveolus* upon the ſlighteſt touch, while the external inciſor preſerved throughout a degree of firmneſs that never afforded any alarm, and the ulceration which extended to it was leſs foul: I ſuſpect, therefore, that the perſon from whom the other two were extracted, conveyed the *lues*: had the diſeaſe originated from the patient, the ulceration would have been leſs partial.

"With reſpect to the length of the time, from the application of the cauſe to the appearance of the diſeaſe, I ſee no well-grounded argument againſt the ſuppoſition I have admitted; as that the ſyphilitic infection has lain ſo long dormant, and afterwards exerted its virulence, I have no doubt. Few diſeaſes afford more anomalous ſymptoms than the venereal, and not one ſymptom occurred in the preſent caſe but what muſt have been ſeen in others repeatedly; the colour of the eruption, its acceſſion, duration, and receſſion; the ulcerations of the tonſils; the *ophthalmia*; and every other circumſtance, appeared to me conſentaneous to other inſtances in the *lues*.

"It cannot be refuted, that with the utmoſt precaution, the ſcion tooth is ſtill a living tooth, has the principle of life ſo far preſerved as to unite with the veſſels of the new *alveolus*; and, conſequently, if it retains a diſeaſe with the living principle, it may alſo convey this diſeaſe to a body, of which it becomes a living member; but perhaps from the hardneſs of its texture, and its ſlow union with the parts to which it is thus nearly allied, it may be longer in conveying the poiſon which it carried from its original ſeat; and this may remove a doubt which has been raiſed reſpecting the lapſe of time between the inſertion of the tooth and the appearance of the diſeaſe.

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* See Hunter's Treatiſe on the Venereal Diſeaſe, pp. 379, 391, 397.

"We never have had any inſtance recorded of ſuch a diſeaſe ſucceeding the inſertion of dead, or of ivory teeth; a dead tooth, whether loſing its living principle, in its original ſeat, without removal, or a dead one, inſerted into the *alveolus* of another perſon, acquires a colour and appearance totally different from a living tooth, whether an original or a tranſplanted tooth. The argument therefore of ſoaking and cleanſing the tooth, conſtitutes no proof againſt the probability of communicating the diſeaſe, as long as the tooth retains the living principle, capable of forming an union with the parts into which it has been inſerted, by a ſpecific medium of circulation, ſuch as exiſts in the natural ſtate; unleſs it be contended that the teeth are incapable of retaining the venereal diſeaſe, which, however, cannot be argued by any analogy, for the diſeaſe ſeems to be particularly determined to ſome of the hard bones of the body, as the *tibia*, *cranium*, &c. and ſometimes remains latent for years, poſſeſſing at the ſame time the genuine ſyphilitic powers; but ſuppoſing the teeth incapable of retaining and communicating the diſeaſe, ſtill the nerves and fleſhy parts about them may do it effectually.

"That this diſeaſe ſhould ſucceed the tranſplanting of teeth, conveys no cenſure upon the dentiſt who performed the operation, as every precaution to obviate ſuch an incident was adopted: the perſons from whom the teeth were extracted, were minutely examined by an eminent ſurgeon, and the tranſplanted ones were ſoaked in lukewarm water for about an hour before they were inſerted into the *alveoli* of the gentleman.

"It is certain, however, that inſtances have occurred with other operators wherein ſuch precautions have not been taken, perhaps from an opinion that the more quickly the tranſition was made, from extracting to inſerting a ſcion tooth, the greater was the probability of the tranſplanted tooth fixing into the *alveolus*."

It will be hardly neceſſary to mention, that the ſooner the ſcion is put into its place, the better, as delay will perpetually loſe the power upon which the union of the two parts depends. *Hunter on the Teeth*, v. II. p. 102.

"From what I can collect," continues Dr. Lettſom, "in an extenſive enquiry into the practice of tranſplanting teeth, about one in every twenty have had the diſeaſe, and of theſe about one fourth have died. It is true, that in ſome of theſe fatal caſes, mercury had been uſed, but it has been in ſuch only, where the patient had been debilitated to an extreme degree, and never where it had been exhibited early, or whilſt a good ſhare of ſtrength remained, ſo far as I know: every perſon acquainted with practice, very well knows, that in ſome inſtances of the *lues* in the common way, the application of mercury will not cure; and, indeed, where the cortex and other tonics have afforded more benefit; but ſuch inſtances are comparatively rare, and form no proof againſt the general efficacy of mercury in the *lues*.

"As the ſpecies of diſeaſe I have deſcribed has not been noticed in this kingdom above ten years, owing probably to the novelty of tranſplanting living teeth, I have given my opinion in the foregoing pages with more heſitation; for had it not been for the circumſtances attending other patients, who have had ſimilar ulcerations of the gums after the operation, I ſhould not have entertained any doubt of the ſyphilitic nature of the preſent caſe.

"The eminent writer, whoſe authority I have already noticed, has related ſeveral examples, which lead one to doubt the real exiſtence of the *lues* in this peculiar diſeaſe of the gums."

Profeſſor Kuhn, of Philadelphia, communicated to Dr. Lettſom the following caſe of ulceration of the gums ſucceeding the tranſplanting of teeth:

"A married lady, in Philadelphia, had two teeth inſerted into the upper jaw by a celebrated dentiſt; theſe ſucceeded extremely well. After ſome time a third was likewiſe inſerted; but this was never perfectly fixed or firm, though for ſix weeks ſhe felt no kind of inconvenience. She then began to complain of a ſtricture about the fauces, and ſome ſymptoms of a ſore throat, with a ſlight ulceration of the tonſils, which ſhe attributed to cold, and for which ſhe loſt about eight ounces of blood from the arm. This not affording her any relief, my attendance was deſired: I found the glands in the neck conſiderably ſwelled and hard, the gum about the laſt inſerted tooth livid, with a loſs of ſubſtance, and the tooth itſelf much looſer than it had been for ſome time; a ſlight fever accompanied the ſymptoms, attended with a loſs of appetite, and ſome degree of nauſea; after ſome days, eruptions appeared over the whole body, and particularly on the arms, and in the palms of the hands, covered with furfuracious ſcales, which were ſoon renewed if removed by deſign or accident. There was no room for even ſuſpecting that ſyphilis could have been the ſource of any of the ſymptoms, and I therefore concluded that the irritation from the laſt inſerted tooth had occaſioned the various ſymptoms of the diſorder. The gum was repeatedly ſcarified, external remedies were applied to the ſwelling in the neck, to prevent an abſceſs, which there was much reaſon to apprehend, and ſmall doſes of neutral ſalts were adminiſtered to moderate or relieve the fever. But though her complaints did not grow worſe under this treatment, I had, after two months' attendance, the mortification to find them no better, and therefore adviſed the removal of the tooth, as the only method that appeared to me effectual to relieve the complaints. This, after ſome heſitation, was complied with; the gum in a few days healed and became perfectly ſound; the ſwelling in the neck abated by degrees; the eruptions vaniſhed, but ſo ſlowly, that it was ſeveral months before they diſappeared entirely. She took a few doſes of bark daily for about a week, to reſtore tone and vigour to the ſyſtem, which had been very much impaired by anxiety and diſtreſs of mind as well as by the diſeaſe."

This ſubject is further illuſtrated by the following caſe, ſent by Dr. Hamilton, of Ipſwich, to Dr. Lettſom. After ſome preliminary obſervations, Dr. Hamilton ſays,

"A white, and an apparently ſound tooth, was taken from the jaw of a ſeemingly healthy perſon, and immediately tranſplanted into the jaw of the lady. Soon after which ſhe began to complain of pain, grew daily worſe, ulcers appeared in the gum where it was inſerted; theſe ſpread, ſunk deeper, communicated to her upper and under jaw, fauces, and tonſils; diſcharged a fœtid ichor, and rapidly continued their ravages, till in no long time after, not only the roof of her mouth, but both upper and under lips were conſumed; her teeth alſo fell out, for the *alveoli* became carious, and ſhe appeared a ſpectacle ſhocking to behold: ſhe lived ſome conſiderable time, however, before death put a period to her miſery.

"We are told of the great care taken by the dentiſts to obtain teeth from ſound perſons; how the ſtricteſt enquiry is made relative to this, before they proceed to the extraction of the tooth; and how, that even when they are fully ſatisfied on this point, they do not ſtop here, but proceed further—they ſoak it well in warm water, and they carefully wipe it clean and dry, before they inſert it into the deſtined jaw.

"I doubt not, but this may be, for the moſt part, ſtrictly true; and that the generality of dentiſts ſcrupulouſly and conſcientiouſly adhere to this plan, I mean ſuch as have a character they wiſh to maintain; but it is feared, there may be exceptions, and that there have been thoſe who paid leſs regard to this neceſſary precaution.

"The gentleman who favours me with the relation of this caſe, ſays, he knows inſtances where the tooth has been taken warm from the one jaw, and the next moment inſerted into that wherein it was deſtined to remain, without any ſuch precautions as theſe being obſerved.

"But the fatality that has attended Sir William Watſon's patient, with the fatality of this I have related, and the brink of death on which your own ſtood, who, I truſt by this time, is removed from all danger, will, it is to be hoped, operate ſo forcibly on the practitioners in this branch, that no poſſible precaution will hereafter be neglected, that can obviate ſuch evil tendency.

"I would not, from theſe caſes, entirely condemn the practice of tranſplanting teeth; I am authoriſed from another correſpondent of obſervation, to aſſert, that it has been attended with utility. That at the end of five years from the operation, the tranſplanted tooth neither ſhewed ſigns of decay, nor did pain, or any other evil tendency, to create an alarm, during this period, ever ſucceed.

"Notwithſtanding this, it may be perhaps as ſafe, not to run the riſque for every trifling blemiſh in this part of the human fabric. A little black ſpeck, of no importance even to beauty, or a tooth not ſtanding altogether ſo exactly in a row with its fellows, ſhould by no means tempt any one to hazard its removal for another, though more beautiful to the eye, which may in a ſhort time be the cauſe of diſeaſe and pain, if not of death.

"That it is the ſyphilis, or confirmed lues, which moſt frequently takes place from this operation, there appears to me ſome reaſon to conclude; and this is ſtrengthened, as well from the frequency of venereal taints in both ſexes, as from conſidering what ſort of perſons they are, who for the ſake of a bribe, ſubmit in this way to the loſs of their teeth: their ways of life, and other circumſtances, give room for ſuſpicion on this head.

"In the caſe related by Sir William Watſon, it yielded to nothing but mercury; the ulcers, after the uſe of this mineral, ſoon began to look better; but a proper quantity could not be adminiſtered, for the patient's ſtrength was too far exhauſted before the trial was made."

SECT. V. *Of* BOILS *and* EXCRESCENCES *of the* GUMS.

Gum-boils may ariſe from cold or from external violence, &c, but moſt frequently they are the conſequence of tooth-ach. The complaint begins with pain attending a tumor on the parts affected; by degrees the ſide of the face ſwells conſiderably; the tumor of the gum now begins to point; and if it be not opened, it burſts and gives the patient immediate relief. When the boil is owing merely to inflammation, after the matter is evacuated, the complaint goes off; but when it proceeds from a caries of a tooth, it will continue as long as the cauſe remains; the tooth therefore ought to be extracted. After the abſceſs has burſt, if the matter continue to be diſcharged, it may ſometimes be dried up by injecting ſome aſtringent liquor; but the moſt effectual method is to lay the abſceſs fully open, and to heal it from the bottom by doſſils of lint. Sometimes abſceſſes occur of a more obſtinate nature, owing to a carious ſtate of the jaw. In that caſe ſuppuration ought to be promoted, and the part laid open as ſoon as matter is formed; keeping the paſſage open for the diſcharge, being the only means for effecting a cure.

EXCRESCENCES of various degrees of firmneſs ſometimes grow upon the gums. Some are ſoft and fungous, while others are of a warty nature. In general they are not attended with pain. They frequently originate from caries of the teeth, or of their ſockets; in which caſe the removal of the decayed teeth, and the ſubſequent exfoliation of the carious part of the jaw, will often accompliſh a cure. But when this does not happen, the tumor ſhould be removed as ſoon as it becomes troubleſome, otherwiſe there may be danger of its ending in cancer. The removal may be effected by a ligature or knife, according as the tumor may have a narrow or broad baſis. It is ſometimes neceſſary to uſe a ſpeculum oris to keep the mouth open. After the tumor is extirpated, the wound ſhould be allowed to bleed freely, to prevent ſubſequent inflammation. When the hemorrhage proceeds too far, it ſhould be reſtrained by the application of ſpirit of wine, or tincture of myrrh, or ſolution of alum, &c. and ſhould theſe prove unſucceſsful, the lunar cauſtic will ſeldom fail of having the deſired effect. No dreſſings can be applied; but for ſome days after the operation, the mouth ſhould be frequently waſhed with a warm emollient decoction; and the cure will be afterwards promoted by the application of ſome gently aſtringent liquor, as port wine, tincture of roſes, &c.

SECT. VI. *Of* ABSCESSES, &c. *in the* ANTRUM MAXILLARE.

This diſeaſe is *known* by a pain and uneaſineſs beginning in the cheek, and extending upwards to the eyes, noſe, and ears, together with a ſwelling, which in the latter ſtages of the diſeaſe tends to a point, moſt frequently in the cheek. Sometimes a diſcharge enſues between the roots of the back-teeth, when they happen to penetrate the antrum. Sometimes a diſcharge of matter from the noſtrils takes place, particularly when the patient lies on the ſide oppoſite to the tumor. The diſeaſe may ariſe from cold, or whatever produces inflammation in general; but the moſt common cauſes are violent fits of the tooth-ach, occaſioning exceſſive pain and inflammation of the membranes of the noſe and antrum.

The *cure* is performed by giving a free diſcharge to the contents of the tumor: and this is done in two ways; either by extracting one of the two anterior great molares, which are ſituated under the antrum, and making a perforation with a round trocar (Plate II. fig. 39), through the bottom of the ſocket; if this has not been already perforated by the fangs of the tooth or eroded, in which caſe, the matter will paſs out immediately after the extraction: or the perforation may be made by the inſtrument repreſented at fig. 50, through that part of the antrum which projects outwardly over the molares. As moſt people wiſh to avoid the drawing of a tooth, when it does not appear to be abſolutely neceſſary, the perforation is commonly made in the way laſt mentioned. Some authors, however, object to this, as not giving a ſufficiently depending opening to the matter. As ſoon as the matter is diſcharged, a plug may be introduced into the perforation, which may be removed frequently to allow the matter to paſs out, and to admit aſtringent ſolutions of bark, &c. to be occaſionally thrown into the cavity of the antrum. In this way a cure is obtained, if the bones be ſound; but if they are carious, it is impoſſible to expect a cure till the diſeaſed portions of the bone exfoliate and be removed. When clotted blood is formed in the antrum, it is to be removed in the ſame manner. Sometimes the tumor of the cheek is owing to a ſwelling of the bones, and no matter is found in the antrum: in that caſe the operation does harm. No external application has yet been diſcovered for removing ſuch a ſwelling, though a long-continued courſe of mercury has been found to be of ſome ſervice.

SECT. VII. *Of* DISEASES *of the* TONGUE.

The tongue is one of thoſe organs of the human body which is but very ſeldom affected with diſeaſes; and when they do occur, they ſeem to ariſe from ſomething of an infectious nature.

Dr. Andrew Ferguſon, of Aberdeen, has given, in the Medical and Phyſical Journal, a very intereſting account of different affections to which this part is obnoxious.—"In my practice," ſays he, "I have met with three different kinds of ulcerations upon the tongue, called aphtha, ſibbenic, and mercurial ulcers; theſe, I conſider as its moſt frequent morbid affections. Aphtha is a diſeaſe moſt commonly ſeizing children when they are very young; it is conſidered as one of the genus of the order exanthemata, accompanied with ſynochus fever, and little whitiſh ulcers, which are ſometimes diſtinct, at other times running together, ſpreading over the tongue and ſurface of the mouth, attended with pain, and ſlight ſwelling of the tongue; when the ſloughs are removed they ſoon grow again: the time of its going off is variable.

"This is the definition of aphtha, and ſerves very well for diſtinguiſhing it; about its cauſes, however, there are various opinions entertained. Although ſeveral of the order of exanthema, are contagious, yet this diſeaſe is not mentioned as ſuch; it is, however, ſaid to be attended with ſynochus; and as moſt of the fevers of this ſpecies are contagious, if we reaſon from analogy, we muſt ſuſpect aphtha of being ſo too. I ſuppoſe that aphtha is rather at firſt a local affection, which has ſomething of a poiſonous ſtimulating nature attached to it, proceeding from a certain morbid condition of the glands of the mammæ: this ſtimulating ichor, iſſuing from the morbid glands, and mixing with the milk, I conſider as the cauſe of this ulceration of the child's tongue. Aphtha does not occur to every child, neither do I ſuppoſe ſuch a morbid ſtate common to the glands of every woman: in the firſt milk of every nurſe, there is ſomething of a ſtimulating nature, which acts upon the child as a cathartic. May not this ſtimulating quality be increaſed ſometimes, ſo as to occaſion this diſeaſe? I have obſerved before, that aphtha is at firſt of a local nature, but when it happens to be violent, it is attended with fever, and univerſal affection: it deſcends by the primæ viæ, occaſioning violent gripes, diarrhœa, and very often convulſions. This diſeaſe always infects the woman's nipples, producing ſores very painful and difficult to heal, and which never will heal as long as the aphtha continues in the child's mouth. Are thoſe who have been affected with the aphtha, exempted from, or leſs liable to be affected with, the ſmall-pox? I aſk this queſtion, becauſe, having inoculated a daughter of Mr. Davidſon, butcher, in this place, who was violently affected with aphtha when very young, ſhe did not take the infection. Some time after, when I was inoculating four children of Mr. Alexander Sangſter, a a relation of Mr. D., Mrs. Davidſon deſired that I ſhould, a ſecond time, attempt to inoculate her daughter. The firſt time, her arm became inflamed a little, and a ſmall puſtule appeared; the ſecond, as a larger wound was made, and a greater quantity of variolous matter introduced, the puſtule was large, and attended with inflammation around; yet no eruption appeared upon the reſt of her body: the other children who were inoculated with the ſame matter, had a good many very fine and diſtinct ſmall-pox. Sibbenic ulcers proceed from a poiſon ſimilar to ſyphilis, and are only a modification of it; the ſame agents which cure the one cure the other. I have noticed this difference, however, that mercury has a more powerful effect in curing ſibbins than ſyphilis; this I ſuppoſe to be owing to the difference of the ſtages of the complaint. I have obſerved, that in the firſt ſtage of ſyphilis, mercury in general has but very little effect until the poiſon begins to exert its influence upon the lymphatic ſyſtem, and has ſuffered ſome change in the body. The ſibbenic ulcers have a very different appearance from aphtha; they have a broader ſurface, appear principally upon the ſides of the tongue; their ſurface is whitiſh, but their edges are ſwelled, and they look very much like cancerous ſores: nothing has ſo great an effect in removing theſe ſores, as the topical application of muriated mercury, along with the agency of the mercurial pill. Mercurial ulcers are occaſioned by mercury, applied either inwardly or outwardly; they want the cancerous appearance of the ſibbenic ulcers; have a darker coloured ſurface in the mouth, and are attended with a diſagreeable fœtid breath, and a taſte reſembling that of copper; unleſs when they are combined with the ſyphilitic poiſon, they require very little medicine, except the frequent application of emollient gargles, to which may be added, a ſmall quantity of the ſulphuret of potaſh.

"The tongue is leſs liable to be affected with inflammation than any of the other organs of the human body, and yet it is more expoſed than any of them to the action of ſtimuli, both of the ſolid and fluid kind; this muſt be owing to the ſtructure of its external covering, which ſeems to be peculiar to itſelf. The internal ſubſtance of the tongue is compoſed of ſeveral muſcles, called geniogloſſus, cerato-gloſſus, ſtylo-gloſſus, and lingualis; the fibres of which are diſpoſed in a longitudinal, tranſverſe, and vertical manner; they enable the tongue to move in all directions, which is important in the operation of ſuction, maſtication, deglutition, and the articulation of the voice: a defect of the muſcles of the tongue produces paraphonia, and ſeveral of the ſpecies of pſelliſmus. One of the principal uſes of the tongue is, to afford the ſenſe of taſte; for this purpoſe it is covered with numerous papillæ, which, from their appearance, have been diſtinguiſhed by the names of capitatæ, ſemilenticulares, and villoſæ; theſe have a communication with the nerves of the tongue: the capitatæ appear principally upon the baſis of the tongue. I have known more than half a dozen of theſe in ſeveral perſons' tongues to be enlarged to the ſize of ſmall peas, without their being even ſenſible of it; the great variety of taſtes is occaſioned by the action of the ſtimulus of our food, &c. on the papillæ. Some animals, owing to the particular ſtructure of theſe, have the ſenſe of taſte more acutely than the human ſpecies.—When the papillæ are diſeaſed, or hurt by the repeated action of violent ſtimuli and narcotics (ſuch as opium and tobacco), their ſenſibility is much diminiſhed, and the taſte impaired. In peripneumony and catarrh, I have obſerved that the ſenſe of taſte is very much impaired; and when this is the caſe, I have found it to be a very good ſign.

"In every univerſal diſeaſe, I make it a common rule to cauſe the patient to ſhew me his tongue, and enquire concerning his ſenſe of taſte; this I conſider to be very material, when preſcribing, as ſometimes his acuteneſs of taſte might prevent him from taking certain very efficacious remedies, which often prove more diſagreeable to the tongue than to the ſtomach. Inability to thruſt out the tongue, and loſs of taſte, have been conſidered as prognoſtic ſigns, indicating great debility and danger: theſe moſt readily occur in the latter ſtages of typhus. In the beginning of fever, when the debility of the functions is not ſo extreme as in the after ſtages, we often perceive a tremor of the tongue, when it is thruſt out: we can form very little idea of the ſtate of the ſtomach from the appearance of the tongue. What we term a *fur* upon the tongue, is not a certain ſign that the ſtomach is foul. I agree with Dr. Domier in this particular. We often find the tongue foul when the digeſtion is good, and *vice verſa.* Some perſons have this *fur* upon their tongues at all times, even from the apex to the baſe; others have very clean tongues, who are much troubled with dyſpepſia. I am acquainted with a perſon whoſe tongue is full of hacks and deep furrows, which interſect it in all directions, and a very deep one in the courſe of the linea linguæ mediana: his tongue is ſeldom white or foul, but appears of a bright red colour, and he has no other complaint excepting a few rotten teeth.

"In no univerſal diſeaſe is the tongue ſo much affected as in fevers, eſpecially when they are long protracted, or attended with putrid ſymptoms. In typhus and its varieties, from the very beginning the tongue is *furred*. As the fever advances, it turns to an aſh-coloured cruſt, which afterwards changes to a brown. The ſame appearance of the tongue accompanies ſeveral other diſeaſes, ſuch as cynanche maligna, tonſillaris, parotidœa, and ſcarlatina anginoſa. In all diſeaſes where there is great debility, attended with putreſcency, the tongue is moſt affected with *fur*. The cauſe of this appearance muſt be debility, and a relaxed ſtate of the ſurface of the tongue and throat, from a deficiency of excitement; for I have frequently obſerved, that thoſe who are of a florid colour, and healthy appearance, have generally the ſurface of the tongue of a redder colour, and cleaner than thoſe who are weakly and pale. The tongue is always of a more beautiful colour at its extremity than its baſe; and when cruſt, or *fur*, of any kind appears, the greateſt quantity is always at the root of the tongue, where there is generally the leaſt motion. In the morning, after the tongue has been at reſt all night, it always looks fouleſt: nothing ſerves the purpoſe of cleaning it ſo well as its action in maſtication, and frequent ſpeaking, which promotes the circulation of the ſaliva, and removes every collection of foulneſs that gathers in the mouth. If this ſhould be found ineffectual, recourſe may be had to tonic gargles, as the beſt means of removing *fur*, and preſerving a vigorous ſtate of the papillæ. The tongue, at its anterior and under part, has a ligamentous band, called frænum, formed of a reduplication of the membrane that lines the inſide of the mouth; this ſeems for fixing and preventing it from making too much motion. When the frænum happens to be too near the extremity of the tongue, ſo that it becomes fixed to that degree that the child cannot put it out, or uſe it, then the diſeaſe, known by the name of *tongue-tied*, takes place. There may be ſeveral degrees of this; that which requires manual aſſiſtance does not ſo often occur as is generally imagined, and many times the operation is performed by midwives when there is no real neceſſity for it."

When this operation, however, is really required, it muſt be performed thus: the child being laid acroſs the nurſe's knee, the ſurgeon ſhould open the mouth, and raiſe the tongue with the two firſt fingers of one hand, while with the other he introduces the ſciſſars, and divides the frænum in the middle, and as far back as is neceſſary.

To this we ſhall add a curious caſe of an unuſual affection of the tongue, by the late Mr. Hayes, of Hampſtead, communicated to the Medical Society of London.

"At ſeven o'clock in the morning," ſays Mr. Hayes, "on the ſecond of January, 1781, I was deſired to viſit J. Wembridges, of North-end, a very ſober, honeſt, labouring man. As I was not very well, my aſſiſtant went to him, and found him in bed, and received the following account from him and his wife, viz. that he had ſupped the night before on bread and cheeſe, and with it drank a pint of porter, and went to bed perfectly well. About three o'clock in the morning he awoke, and looked at his watch to ſee if it was time to go to his work; but finding it too early, ſlept again till between five and ſix. At this time nothing ailed him; he then got up, and went to his work acroſs Hampſtead Heath, as uſual. In the way *he thought his tongue ſeemed to ſwell*, as it really did, and continued to do ſo till he could hardly be underſtood when he ſpoke. My aſſiſtant bled him pretty largely, and gave him an ounce and a half of ſal catharticum amarum diſſolvedin ſome liquid. About eleven o'clock I ſaw him myſelf, and found the above account confirmed. His tongue was amazingly ſwelled, the face exceedingly florid, and a large proportion of blood ſeemed derived to the whole head. He complained of an inſufferable pain in his back and loins, that he could with difficulty ſit up while I repeated the bleeding; which I immediately performed, to the amount of ſixteen ounces. The pain in the back was ſomewhat abated by the bleeding, but the tongue was ſo much ſwelled, as greatly to impede his breathing; and it was with the greateſt difficulty that he ſwallowed any thing. Warm injections and fumigations were applied frequently to the tongue; emollient clyſters were exhibited; the feet were put into warm water; a nitrous ſaline mixture, with tartar emetic, &c. was given as often as poſſible. His pulſe beat 130 in a minute, and was full, hard, and ſtrong, which determined me in the evening to repeat the bleeding; and I took ten ounces more blood from him. Although he got ſtools from the firſt ſalts, I repeated them on the morning of the third, which operated very well. The antimonial ſaline mixture had ſweated him a little; but the difficulty which he had to breathe, prevented his lying down and encouraging it. I ordered fumigations of vinegar and red port; the clyſters and pediluvium to be repeated; but there was not the leaſt abatement of the ſize of the tongue; and it now began to look of a dark black colour, or rather as if it had been broiled over a ſmoky fire. Indeed I expected it would mortify. In a caſe ſo ſingular, I confeſs I knew not what to do; and indeed had I known, there was very great difficulty to get any thing down his throat. I ordered the continuance of the antimonials, and ſent him a large bliſter to put round the whole throat, with powdered camphor ſpread over it. This was put on for a little time, but had not drawn at all; when ſome of the neighbours fetched Mr. Goodwin, an ingenious ſurgeon of this town, to ſee him, at a time when I was from home. He recommended the bliſter to be taken off, and a poultice of bread and milk to be applied to the throat, and a large bliſter between the ſhoulders. When I came home in the evening the above had been done, but not with the leaſt benefit. On the morning of the fourth

I ſaw him early, much the ſame as the preceding night. The bliſter had drawn, and the poultices had been kept on, and frequently renewed warm. I ordered four grains of James's powder every third hour; ſaw him in the middle of the day, much the ſame. At night I was ſent for in great haſte, and was told he was dying: indeed he had every appearance of being ſo, except that his pulſe was ſtill quick, full, and hard. The James's powder had ſweated him profuſely, but without any evident benefit. I ventured to bleed him again in this ſtate, and ordered the poultice to be taken off, and the bliſter to be put round the throat, as I had before directed. As ſoon as the bliſter began to act, and to diſcharge any lymph, the tongue gradually leſſened; he breathed freer, the tongue became white and moiſt, and by the next evening he was out of all danger; and a couple of purges completed his cure. It may not be improper to remark, that he had not the leaſt ſwelling of the gums, palate, or throat, nor any complaint in the head; nor did his blood ſhew any large portion of buff; and the ſerum and craſſamentum were proportionable."

Mr. Hayes follows up this ſingular narrative with a caſe, in which an old lady, aged 81, rather of a ſcorbutic habit of body, though remarkably healthy for her time of life, was affected with a troubleſome itching that came on her hands, and other parts of her body, particularly at night, after ſhe became warm in bed. This, it appears, was cauſed by a number of lumps or weals, like thoſe of the *nettle-raſh*, which aroſe upon the ſkin, and the itching hindered her getting her uſual ſleep at night, but ſubſided in the morning, and left a degree of roughneſs on the ſkin. One of theſe eruptions being particularly troubleſome to her, ſhe endeavoured to abate the violence of the itching by licking the part with her tongue, by which the latter became conſiderably affected, though not preciſely in the way ſtated in the preceding inſtance. For this, and ſome other intereſting communications on theſe unuſual complaints, we refer the reader to vol. II. of the Memoirs of the Medical Society of London, p. 193.

SECT. VIII. ULCERS *in the* MOUTH.

When ulcers of the mouth ariſe from a general affection of the ſyſtem, this muſt be removed before a cure can be expected. When they originate from ſharp points on the teeth, theſe are to be filed off, and ſome aſtringent ſolution taken occaſionally into the mouth. Notwithſtanding theſe and other remedies, the ſores ſometimes become worſe, diſcharging a thin fetid ſanies, attended with much pain, and putting on every appearance of cancer. In this ſituation, *extirpation* is the only thing that can effect a cure. If the ſore be only ſuperficial, it may pretty readily be extirpated; but when deep-ſeated, it may ſometimes be neceſſary to cut through the whole ſubſtance of the cheek, and heal the ſore by the hare-lip ſuture. When the tongue is the ſubject of operation, the operator ought to be ready to take up the bleeding veſſels by the tenaculum or the needle. Along with ligature, it may be neceſſary to uſe aſtringent gargles, or a mixture of vitriolic acid in water. If theſe fail, the potential or even actual cautery muſt be uſed.

SECT. IX. *Of* ENLARGEMENT *of the* TONSILS *and* UVULA.

The TONSILS ſometimes grow ſo large and hard as to become incurable, and even to threaten ſuffocation. The tumors here have been commonly conſidered to be of a ſcirrhous nature; but they are neither attended with ſhooting pain, nor are they apt to degenerate into cancer; neither do ſwellings return after the tonſils have been extirpated; hence they ought not to be removed till by their ſize they impede deglutition or reſpiration; but whenever they do this, they may be removed with ſafety. The only proper method of removing them is that by ligatures, which are not only void of danger, but ſeldom fail to perform a cure. If the baſe of the tonſil be ſmaller than the top, the ligature is to be uſed as for polypi in the throat; but however broad the baſe of it may be, much difficulty will ſeldom occur in fixing it, for the ſwelling is always very prominent. In diſeaſes of this kind both tonſils are generally affected; but if the removal of one of them forms a ſufficient paſſage for the food, the other may be allowed to remain. When, however, it is neceſſary to extirpate them both, the inflammatory ſymptoms produced by the extirpation of the firſt ſhould be allowed to ſubſide before any attempt be made to remove the other.

When the form of the tonſils happens to be conical, ſo that the ligature would be apt to ſlip over their extremities, Mr. Cheſelden has recommended a needle (fig. 45), with an eye near the point: a double ligature being put into the eye, the inſtrument is to be puſhed through the centre of the baſe of the tumor, and the ligature being laid hold of by a hook and pulled forwards, the inſtrument is to be withdrawn; then it is to be divided, and ſo tied that each part may ſurround one half of the tumor. This method, however, is ſcarcely ever found to be neceſſary.

The following curious caſe of *calculous concretions formed in the tonſils*, has been publiſhed by Mr. Hewitt, ſurgeon, at Hull:

Mrs. H——, aged 39, and of a corpulent habit, about nine years ago, by expoſure to cold, was attacked with the uſual ſymptoms of inflamed ſore throat. The left tonſil was particularly inflamed, and came to ſuppuration. In about three months the abſceſs broke, and diſcharged matter of a proper conſiſtence. Three days afterwards, the ſurgeon who then attended her, introduced a probe, and very diſtinctly felt a hard, rough ſubſtance. On the ſame day, a ſtone, of a light yellow colour, and about the ſize of a ſmall field bean, came from the orifice. She had at this time a child at the breaſt, eighteen months old. She remained a widow five years; in her ſixth year ſhe was married to her ſecond huſband, and again became pregnant. Mr. Hewitt attended her during her pregnancy, when ſhe parted with two concretions from the ſame tonſil, both ſmaller than the firſt; but without any previous inflammation or ſuppuration. She again became pregnant, and parted with a ſtone as the laſt. About the month of July, 1799, during her laſt pregnancy, the glands of her neck were much ſwollen, but ſhe felt no pain, nor was there any appearance of inflammation. One month, however, after delivery, the left tonſil became very much inflamed, and in a fortnight ſuppurated. The diſcharge was conſiderable for a few days; after which Mr. Hewitt introduced his finger into her mouth, and felt the end of a ſtone, which, by gentle preſſure forwards came into the mouth.

Enlargements of the UVULA, from inflammation or from other cauſes, may generally be removed by the frequent uſe of aſtringent gargles, as of ſtrong infuſions of red roſe leaves or of Peruvian bark. But when theſe fail, and the enlargement is ſo conſiderable as to give great uneaſineſs by impeding deglutition, irritating the throat, and ſo cauſing cough, retching, and vomiting, extirpation is the only thing upon which any dependence can be placed. *Exciſion* is the readieſt method when the uvula is only elongated; but when the ſize is conſiderable, dangerous hæmorrhages ſometimes attend this method; on which account a ligature is preferable. The operation may be readily performed by a knife of the common kind; ſome prefer the curved probe-pointed biſtoury.

In *performing the operation*, the ſpeculum oris (fig. 46) is neceſſary to keep the mouth ſufficiently open, and the uvula ſhould be laid hold of by a pair of forceps or a ſmall hook, ſo as to keep it firm, and prevent it from falling into the throat. After the operation, if the bleeding be conſiderable, it may be checked by aſtringent gargles, or by touching the part with lunar cauſtic; but this will ſeldom be neceſſary.

When a *ligature* is to be employed, it may be readily done according to the method recommended in the extirpation of polypi. A double canula with a ligature may be paſſed through the noſe, or the ligature may be applied according to Cheſelden's method in extirpation of the tonſils.

SECT. X. *Of* SCARIFYING *and* FOMENTING *the* THROAT.

In inflammatory affections of the throat, the means commonly employed are gargles, fomentation, ſcarification, or topical bleeding

Gargles are uſeful for cleaning the fauces from thick mucus or other ſordes; they may likewiſe be uſeful in caſes of ulceration. In relaxation of the parts, they are employed to advantage when made of aſtringent materials. Fomentations may be of ſome uſe when externally applied; but the ſteam of water, &c. drawn into the throat, by means of that excellent invention *Mudge's* INHALER, is preferable. Sometimes it is neceſſary to draw blood alſo from the part affected. Here recourſe may be had to ſcarifying with a common lancet, the tongue being depreſſed with a ſpatula. It may be ſtill more readily done by the ſcarificator (fig. 47). After a ſufficient number of punctures have been made, the flow of blood may be promoted by the patient's frequently applying warm water to the punctures. When an abſceſs forms, notwithſtanding the uſe of theſe remedies, the matter may be diſcharged with the ſcarificator already mentioned.

SECT. XI. MORBID CONTRACTION *of the* ŒSOPHAGUS.

This diſeaſe has only been treated of by Dr. Munckley, who reckons it one of the moſt deplorable incident to the human body. Its beginning is in general ſo ſlight as to be ſcarce worth notice, the patients perceiving only a ſmall impediment to the ſwallowing of ſolid food: they uſually continue in this ſtate for many months; during which, all liquid foods, and even ſolids themſelves, when cut ſmall and ſwallowed leiſurely, are got down without much difficulty: by degrees the evil increaſes, and the paſſage through the œſophagus becomes ſo narrow, that not the ſmalleſt ſolid whatever can paſs through it; but, after having been detained for ſome time at the part where the obſtacle is formed, is returned again with a hollow noiſe of a very peculiar kind, and with the appearance of convulſion.

The ſeat of this malady is ſometimes near the top of the œſophagus, and at other times further down, nearer the ſuperior orifice of the ſtomach. In this laſt caſe, the part of the alimentary tube which is above the obſtruction, is frequently ſo dilated by the food which is detained in it as to be capable of containing a large quantity; and the kind of vomiting, by which it is again returned through the mouth, comes on ſooner or later after the attempt to ſwallow, in proportion to the nearneſs or remoteneſs of the part affected. In the laſt ſtage of this diſeaſe, not even liquids themſelves can be ſwallowed ſo as to paſs into the ſtomach, and the patient dies literally ſtarved to death.

On the diſſection of ſuch as have died in this manner, the œſophagus is found to be conſiderably thickened; and in ſome ſo contracted within, at the diſeaſed part, as ſcarcely to admit the paſſing of a common probe: in others, to adhere together in ſuch a manner as entirely to cloſe up the paſſage, and not to be ſeparated without great difficulty.

He comes next to ſhew what he has found to be the moſt efficacious method of treating this diſeaſe, which, though not uncommon, yet in general has been conſidered as incurable.

He claims not the merit of having diſcovered the method of cure, but hopes that ſome ſervice may ariſe from publiſhing what his experience has confirmed to him; having firſt received the hint from another eminent phyſician.

The only medicine, then, from the uſe of which he has ever found any ſervice, is mercury; and in caſes which are recent, and where the ſymptoms have not riſen to any great height, ſmall doſes of mercury given every night, and prevented, by purgative medicines, from affecting the mouth, have accompliſhed the cure.

But where the complaint has been of long ſtanding, and the ſymptom has come on of the food's being returned through the mouth, a more powerful method of treatment becomes neceſſary. In this caſe he has never found any thing of the leaſt avail in removing any of the ſymptoms but mercury, uſed in ſuch a manner as to raiſe a gentle but conſtant ſpitting: and this method he has purſued with the happieſt ſucceſs. If this method be commenced before the complaint has gained too much ground upon the conſtitution, the caſe is not to be deſpaired of; and of thoſe who have come under his care in this ſtate, by much the greater part have received conſiderable benefit from it, and many have been entirely cured.

The complaint itſelf, he obſerves, is not very uncommon; but there is no inſtance, to his knowledge, recorded, of ſucceſs from any other manner of treating it, than that above recommended.

We have the following obſervations on this morbid affection of the throat in the Memoirs of the Medical Society of London, by Mr. Wathen, an eminent ſurgeon in London:

"We meet," ſays he, "with many diſorders properly chirurgical, which admit only of a palliative cure, and others that are in their own nature abſolutely incurable. Here the *prognoſis*, though a painful and mortifying taſk, becomes as neceſſary to be predicted, as in other more agreeable and fortunate caſes. But this *prognoſis* which reſults from the *diagnoſis*, as an inference from a certain axiom, and which we are obliged in almoſt every inſtance not only to form to ourſelves, but to communicate to the patient or his friends, requires the greateſt caution and prudence. If we foreſee the diſeaſe will turn out fatal, a limb remain deformed, or a part continue uſeleſs, we are under the neceſſity of making a ſuitable prediction; but if this be done ſuddenly or abruptly, we give a ſhock, which will rebound upon ourſelves. If it be not clearly expreſſed, we are liable to have our words miſtaken or perverted; and if not delivered to a proper perſon, in whom we may confide and truſt, as our ſubſtantial evidence, either of the aforeſaid events will at length be reflected on the careleſſneſs or incapacity of the ſurgeon.

"The *conſtricted œſophagus*, a diſorder which of late years occurs, I believe, more frequently than formerly, is one of this claſs. It is abſolutely incurable, except in an early ſtate, and before an ulcer commences; or, in other words, whilſt the contraction of the tube is yet ſimple, with no other thickneſs or ſolidity, than what ariſes from its texture being compriſed in a leſs ſpace than before. I have been conſulted in at leaſt forty caſes of this kind within the laſt twenty years, and whatever be the cauſe, whether the ſwallowing hot, ſcalding, or ſpirituous liquors, from accident or habit, which I think not improbable, its ſeat is, nine times out of ten, in that part of the canal where it adheres to the back of the *thyroid cartilage*. In this ſtage, a daily introduction of the bougie, the ſize of which ſhould be daily increaſed, and frequently ſwallowing pills, and at laſt boluſes, of butter and boiled fat, will by degrees dilate the tube in that part. I lately cured a caſe in this ſtate of the diſeaſe, in which Mr. Elſe was concerned with me. There are ſome now living, who have been well ſeveral years, from the ſame mode of treatment. I have examined ſeveral, who died in conſequence of this ſimple ſtate of the diſorder without the leaſt ulceration, the tube being ſo entirely cloſed as not to admit the ſmalleſt probe; but when the part ulcerates, its cylindrical form is perverted, and *ſacculi* are formed, &c. death muſt inevitably follow. The ulcer in ſome inſtances erodes the *thyroid* and *cricoid* cartilages or the *aſpera arteria*, or elſe it penetrates laterally through the coats of the *gula*, through which the food and drink attempted to be ſwallowed make their way, and ſuddenly put an end to the patient's miſery. I have opened ſeveral where theſe effects, with ſome others, were truly apparent, and have a drawing of one with a large hole in the ſide of the *œſophagus*, through which the food eſcaped into the thorax.

"There is another mortal diſeaſe," continues Mr. Wathen, "which I do not find deſcribed in any writings that have occurred in my reading. It is *an ulcer in the ventricles of the larynx*, accompanied with a remarkable hoarſeneſs, and perpetual irritation at the top of the windpipe, which excites a cough: nothing abates this hoarſeneſs, or cough; there is no pain, or ſoreneſs in the lungs; it commences in ſome who are otherwiſe in perfect health, and continues ſome years before it brings them to extremities. The cough in time expels real *pus*, which increaſes more and more; the patient becomes hectic, and dies."

In the ſame publication we find the following account of a *ſcirrhous œſophagus*, related by Dr. Farquharſon, of Edinburgh. After obſerving that the *conſtricted œſophagus* is one of the moſt deplorable diſeaſes to which the human body is ſubject, and though not uncommon, ſeldom deſcribed by medical writers, the doctor deſcribes the particulars in the following way:

" June 10, 1787. William Glen, aged 44, naturally delicate, of a ſlender make, remarkably pale complexion, very weak and extremely emaciated, conſulted me for a diſorder in the œſophagus, about half way between the throat and ſtomach, which rendered him perfectly incapable of ſwallowing ſolid food of any kind; and even cauſed the moſt liquid food to be rejected, after remaining ſome hours in his throat.

" On examination, I found that he had laboured under this complaint, though in a leſs degree, ſince the beginning of January, 1787. He gave me the following hiſtory of his caſe:

" January the firſt, he was ſeized with a cold and ſlight fever, to which he was very ſubject; this confined him to his bed for ten days. When he began to recover, he felt a ſlight difficulty of ſwallowing, which he attributed to wind meeting the food in its paſſage to the ſtomach.

" For this ſuppoſed windy complaint he conſulted a druggiſt of this place, who ordered him ſome hiera picra infuſed in brandy; a wine-glaſsful to be taken twice a-day. This increaſed his complaints ſo much, that he left off uſing it in leſs than a week; and took no more medicines till after he conſulted me. It will not be improper to obſerve here, that this patient had never found ſpirits agree with him; but ſince January laſt they increaſed his ſufferings very much. He was temperate in the uſe of every thing, except drinking tea and ſmoking tobacco.

" From this time he grew daily worſe; ſo that by the end of February every bit of his ſolid and part of his liquid food was rejected, after remaining four, five, or ſix hours in the œſophagus. From the time of his ſwallowing any food to the time of its being rejected, he was very uneaſy. He complained of a ſenſe of weight and fulneſs in his breaſt, and a violent pain in his back, nearly oppoſite to the cardia. Theſe ſymptoms went off after the food came up.

" He was now reduced to the neceſſity of ſubſiſting entirely on the moſt liquid food, taken often, but in a ſmall quantity at once; though he could ſtill ſwallow freſh butter pretty well, and had a great deſire for it, yet his poverty prevented him from procuring a ſufficient quantity.

" As his food was now ſeldom retained more than an hour, or two at moſt, and was thrown up in greater quantities than formerly, he loſt his ſtrength and fleſh ſo much, that he began to be alarmed; and for the firſt time thought himſelf in danger.

" June 10th he conſulted me. I immediately ſuſpected the cauſe of this diſorder, and though I had very little hopes of curing him, as the diſeaſe was ſo far advanced, yet, that I might not ſeem to abandon him to his fate, I reſolved to give mercury a fair trial; which was the only medicine I had ever ſeen of uſe in the like circumſtances. As I judged it neceſſary to produce a gentle ſalivation as quickly as poſſible, I ordered him three grains of calomel, and one grain of opium, every night at bed-time, with a laxative occaſionally, to obviate coſtiveneſs. At the ſame time I ordered him to be fed with milk or rich broth, a good deal of freſh butter, and a little wine daily.

" In about ten days he began to ſpit gently; and in about a month more I was agreeably ſurpriſed to find him ſo much relieved, that he could ſwallow liquid food without difficulty, and got over even ſolids, when cut ſmall and well chewed. Neither ſolids nor liquids were now rejected. The pain in his back, and ſenſe of weight and fulneſs at his breaſt, had gone off; and he began to gather fleſh and ſtrength, ſo that I had every reaſon to look for a perfect cure.

" As he now ſalivated freely, I ordered him to omit his medicines every other night, to guard againſt cold, to live on the moſt nouriſhing diet he could procure, and to increaſe his ordinary quantity of wine. However, he unluckily expoſed himſelf in a rainy day, and got a rheumatiſm in his thigh. This, and the idea of his being out of danger, made him give up his medicines entirely; and I heard no more of him till the 25th of September, when he was admitted into the General Diſpenſary at Paiſley.

" Mr. White, one of the ſurgeons, examined him with me. We found things had taken a ſurpriſing turn for the worſe. All his complaints had returned with greater violence than ever; his inability of ſwallowing, even liquid food, had increaſed; and every thing he took was rejected in a ſhorter time than formerly, with a particular gurgling noiſe. He had pain, as well as the ſenſe of weight and fulneſs at his breaſt; and the pain of his back was now conſtant and more ſevere. The dilatation of the upper part of the œſophagus was plainly perceptible; he was extremely weakened and emaciated. He never had a ſtool without a clyſter or a laxative; and it was with difficulty he got down as much of the laxative as kept his body open. His pulſe was regular, but weak; and his breathing was not at all affected. He informed us, that his complaints had returned in a ſhort time after quitting his medicines, and immediately after his ſalivation ceaſed.

" In this ſituation little could be expected from medicines; however, we ordered the calomel and opium to be repeated, and ℥ij of mercurial ointment to be rubbed into the pained part of his throat every night at bed-time, with ſome decoction of woods after it, and a laxative occaſionally. We likewiſe ordered half a pint of wine, and a clyſter of mutton-broth daily. At the ſame time we gave particular directions about feeding him.

" Notwithſtanding all our endeavours, his diſeaſe gained ground daily; ſo that by the middle of October every particle of his food was rejected in a few minutes, mixed with a great quantity of mucus and ſaliva. His weakneſs and emaciation were now ſo extreme, that he could not move off his back; and for ſome days before his death he was generally in a ſtate of ſtupor, unleſs he was ſpoke to; yet he ſtill expreſſed a deſire for food; and his breathing was not in the leaſt affected, as the day before his death he ſlept with his mouth ſhut, and without a pillow, in his ordinary manner. We now ordered the broth clyſters to be repeated thrice a-day, without any effect; for on the 27th of October he expired without a ſtruggle, abſolutely ſtarved to death."

Mr. Thynne, one of the ſurgeons of the Diſpenſary, opened the body and diſcovered the following appearances:

" The emaciation was extreme; not a particle of fat was to be ſeen; and even the muſcles themſelves ſeemed to be waſted.

" On laying bare the œſophagus, we perceived about ſix inches of it, beginning a little below the pharynx, much dilated; and about two inches and a half from that, to near the cardia, perfectly ſcirrhous.

" On cutting it open, we found the coats of the dilated part much thinner than ordinary; the inner coat was extremely ſmooth, and perfectly free from ulceration. This part of the œſophagus contained a great quantity of mucus and ſaliva, with a little of the aliment, but no pus.

" The ſcirrhous portion of the œſophagus was completely impervious, and afforded conſiderable reſiſtance to the ſmall blade of a probe ſciſſars, with which it was cut open. The coats of this portion were imperceptible, being confounded in the ſcirrhous maſs.

" The ſtomach ſhewed no appearances of diſeaſe; only the coronary vein was uncommonly large, and much diſtended with dark-coloured blood. There was a great quantity of a fluid in the ſtomach, which appeared to be principally bile and mucus.

" The inteſtines, liver, gall-bladder, pancreas, and ſpleen, were in a natural ſtate.

" The ſubſtance of the lungs was remarkably white; and the ſmalleſt ramifications of the veins appeared as if they had been filled with a black injection. Both lobes, but particularly the right, adhered ſtrongly to the pleura.

" The heart was not larger than that of a child ſix years old, yet it ſeemed perfect in all its parts, and the arteries and veins connected with it were of the ordinary ſize; but their coats were remarkably white and thin. There was no water in the pericardium, or ſacs of the pleura."

In an engraving ſubjoined to the caſe, a repreſentation of the diſeaſed part of the œſophagus is given. See Mem. Med. Soc. of London, vol. II. p. 371.

In treating on theſe miſerable caſes in which ſo little can be done by any of the remedies of which mention has yet been made, we can by no means paſs over the trials made by Mr. Home of the cauſtic, applied in the ſame manner as in ſtrictures of the urethra. To this attempt Mr. Home was encouraged by attentively conſidering ſome caſes of contracted œſophagus which had fallen under his notice, and in which he was able to aſcertain to his own ſatisfaction a ſtrong reſemblance between that diſeaſe and the ſtricture of the urethra in which the cauſtic had been applied with ſo much benefit. We extract the two laſt of the caſes related in Mr. Home's Practical Obſervations, as beſt calculated to ſhew how far this remedy promiſes to be advantageous.

Case I. "A gentleman, aged 43, of a very irritable habit, extremely nervous, and readily agitated by caſual occurrences, in March, 1796, had, for the firſt time, a difficulty in ſwallowing, which increaſed gradually, and was attended with ſymptoms of great irritation; as quick pulſe, hot ſkin, fits of choking, ſickneſs, and bringing up great quantities of mucus from the ſtomach. In this ſtate the bougie was had recourſe to; and although the point of the bougie paſſed through the ſtricture, it rather increaſed the irritation. Its uſe was perſevered in for ſix weeks; but the complaint became ſo much worſe in that time, as to raiſe apprehenſions reſpecting the patient's life. Under theſe circumſtances he came to London in June, 1796, attended by his ſurgeon, to ſee what chance there was of the uſe of the cauſtic affording relief.

"At the time I ſaw him he was in a ſtate of great irritation, with a quick pulſe, hot ſkin, great hurry of ſpirits, almoſt approaching delirium; his voice not reaching much beyond a whiſper, a great degree of impatience in his temper; and any attempt to ſwallow attended with convulſive ſpaſms in his throat, and at thoſe times a great deal of phlegm was diſcharged. The ſtricture was ſituated nearly behind the middle of the thyroide cartilage; it did not admit the end of a bougie, the diameter of which was five-twentieths of an inch. As he could not live in his preſent ſtate, all riſk was out of the queſtion, and the only thing to be conſidered was, whether there was a chance of relief from the cauſtic. I did not heſitate in giving a decided opinion, that the cauſtic was not likely to aggravate the preſent ſymptoms, and that it was highly probable it might remove the obſtruction. From theſe aſſurances, the patient very willingly ſubmitted to its being tried.

"The cauſtic was applied by means of a bougie, in the ſame manner as to a ſtricture in the urethra. The common bougie was paſſed down to the obſtruction, and while there, the part oppoſite the cutting edge of the front teeth of the upper jaw was marked, to determine the exact diſtance of the ſtricture; this bougie was then withdrawn, and the curve it had taken carefully preſerved. The ſame curve was given to the armed bougie, upon which the exact diſtance was marked; it was then introduced, and the cauſtic allowed to reſt for about half a minute againſt the obſtruction: it gave little or no pain, brought on no local inflammation, and in the courſe of the day there was leſs ſpaſmodic affection of the œſophagus when he attempted to ſwallow. This gave encouragement to repeat the uſe of the cauſtic, and it was applied four times, once every other day, each application gave evident relief.

"After the fourth application, he could ſwallow fluids without any difficulty, and could get down morſels of meat with more eaſe than he had done ſince the beginning of his illneſs. The armed bougie did not paſs through the ſtricture, there was therefore no reaſon to believe that it was wholly deſtroyed; but the confinement to the houſe in London, in addition to the effects of the cauſtic, brought on a fever, which made it neceſſary to diſcontinue the uſe of the cauſtic; the fever went off in a week, and he ſwallowed with little difficulty, had leſs phlegm collected in the œſophagus, and his voice was more diſtinct. It was thought right to attend to his general health, and with that view he went immediately into the country, where he recovered ſtrength, and was able to walk two miles without fatigue. He went to the ſea in the autumn, in which ſituation his health was ſtill more improved. He did not attempt bathing.

"He returned to London in March, 1797. He had not loſt any ground reſpecting his ſwallowing ſince the cauſtic was uſed, his voice was more diſtinct than laſt year, his fits of choking leſs frequent, and the quantity of phlegm collected in the œſophagus not ſo great as before, although he was ſtill ſometimes liable to it.

"It is remarkable, that whenever he was ſick and retched to vomit, there was no difficulty in bringing up the contents of the ſtomach, that action relaxing the ſtricture.

"With a view of relieving his complaint ſtill further, which it was not thought prudent to attempt in the ſtate of irritation that he was in the year before, the cauſtic was again applied. I now ventured to employ the lunar cauſtic of the full ſize, in which the ſticks are caſt for the common purpoſes in ſurgery, which is more than double the ſize of that I had formerly uſed, the bougie was of neceſſity alſo much larger. The cauſtic was firſt applied on March 18th, it gave no violent pain; but the ſenſation produced by it remained for half an hour, and then went off. On the 22d it was repeated; he had caught a cold, which at that time was very general in London; this increaſed the quantity of phlegm formed in his mouth and throat, but did not prevent us from proſecuting the uſe of the cauſtic. The 24th the armed bougie paſſed through the ſtricture, and immediately ſome thick phlegm was brought up, which appeared to have been lodged in that part of the œſophagus. 25th, He ſwallowed conſiderably better, and his voice was diſtinctly louder than common; this was evident to all his friends. 26th, The application of the cauſtic was repeated, and the armed bougie again went through the ſtricture. Having gained ſo much, I did not think it prudent to attempt further enlargement till it ſhould be aſcertained, after leaving the parts ſometimes to themſelves, that it was abſolutely neceſſary; and he went into the country, London not agreeing with his general health, and his cold being rather increaſed. I have ſince heard, at ſeveral different times, that he continues better than he was at the time he left town, and ſwallows very comfortably.

Case II. "A gentleman, aged fifty-four, for twelve years felt occaſionally a pain in his ſtomach, and in the laſt two years of that period the returns became more frequent, attended with violent retching, without bringing any thing from his ſtomach but phlegm. In November, 1795, after a very ſevere attack of this kind, he found a difficulty in ſwallowing morſels of the uſual ſize; this increaſed ſo much, that in March, 1796, he was unable to ſwallow meat. In June the difficulty was ſo alarming as to require medical aſſiſtance. On the 20th of June, a bougie, ſmaller at the end than the point of the little finger, was paſſed into the œſophagus: it met an obſtruction behind the cartilages of the larynx, but was puſhed beyond this tight part. It was paſſed regularly for thirty-two days, but did not produce the ſmalleſt improvement in the act of ſwallowing. On July 18th, he put himſelf under my care; at that time he could ſwallow liquids a little at a time, but even this required caution; bread and butter, and ſopped bread, were often got down with more eaſe than liquids. He ſwallowed better at one time than at another, and could tell from his feelings, without making the attempt, whether he could ſwallow better or not. He was ſubject to occaſional fits of irritation, and at theſe times brought up a great deal of mucus and phlegm. As the bougie had failed, I propoſed the uſe of the cauſtic, to which he readily conſented. The curve from the mouth to the œſophagus was aſcertained by paſſing a bougie of a large ſize down to the ſtricture; an armed bougie was then moulded into the ſhape in which the other came out; it was paſſed down to the ſtricture, and allowed to remain there ſome ſeconds; it gave no pain, brought on no irritation, and he ſwallowed ſome water immediately afterwards with more eaſe than uſual; next day he eat one morſel of roaſted veal without difficulty. 20th, The cauſtic was again applied for half a minute; the preſſure made uſe of gave pain. He ſwallowed ſome water immediately after, and got down two gulps at once, which he remarked he had been unable to do before. 21ſt, He eat a ſmall piece of mutton, and thought he ſwallowed better: 22d, the cauſtic was applied for a ſtill longer time; he drank ſome water, which readily paſſed the ſtricture, but ſtopped ſomewhere near the ſtomach, before it went into that viſcus: 24th, the cauſtic was repeated, and gave leſs uneaſineſs: 27th, the armed bougie paſſed through the ſtricture, to which it had now been applied five times. Auguſt 1ſt, he ſwallowed tolerably well, but the food met with an obſtruction near the ſtomach, which was now ſo much increaſed, that the morſel was forced up again.

"I attempted to paſs a long bougie down to this obſtruction near the ſtomach, but it was too large to go through the firſt ſtricture: 3d, the cauſtic was therefore again applied to the firſt ſtricture; when he ſwallowed gently, the morſel got into the ſtomach, but any hurry brought on ſpaſm near the cardia, which made him retch and bring it up again: 4th, this ſtoppage at the orifice of the ſtomach had been ſo great, as to prevent any thing getting into the ſtomach, although it readily paſſed down to that part.

"This led me to believe that there was a diſeaſe near the orifice of the ſtomach, of which the ſtricture in the œſophagus was only a conſequence, ſimilar to what happens in the urethra; a ſtricture near the neck of the bladder, producing a contraction in other parts of the canal. As this diſeaſe, of whatever kind it might be, was out of the reach of ſurgery, I deſired the aſſiſtance of a phyſician, and Dr. Pitcairn was called in.

"It was propoſed that a bliſter ſhould be applied to the pit of the ſtomach, and that the patient ſhould go through a courſe of mercurial frictions, uſing nutritious broth clyſters. For two or three days he could not ſwallow at all; on the ninth, ſome food paſſed into the ſtomach, but it could not be retained there. 12th, He was able to retain twelve ounces of aſſes-milk, given in ſmall quantities through the day; his pulſe was more regular, but very weak. While the gums were ſore from the mercury, he thought he ſwallowed better, and worſe when the effects of the mercury went off.

"September 1ſt, he grew weaker; the uſe of the mercury was therefore left off. He now retained ſcarcely any thing upon his ſtomach, and that principally wine: he brought up occaſionally a great deal of mucus mixed with matter.

"On the fifth of September he died. This happened in the country, and the nature of the diſeaſe in the ſtomach was not permitted to be aſcertained by an examination after death."

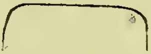
The following caſes of Dyſphagia, illuſtrated with engravings, occur in vol. IV. of the Medical and Phyſical Journal.

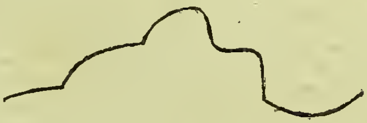
Case I. Is an account of the diſſection of a woman, aged 65 years, who had been ſubject, for five years preceding her death, to a ſickneſs and retching, and a ſenſation of pain in ſwallowing in the track of the ſpine and œſophagus.

Before her death this lady, for the laſt fortnight, ſcarcely ſwallowed any thing. For about that time too, the ſpitting and expectoration of mucus had ſtopped. She was incapable of ſpeaking for the laſt four or five days, but retained her ſenſes to the laſt moment, though her pulſe had not been perceptible for two days.

" Upon laying open the cavity of the abdomen, and feeling in the region of the ſtomach, we were ſtruck," ſays Dr. Helſham, who communicates the particulars, " with the appearance of ſome protuberant ſwelling behind it; but as we wiſhed firſt to make a careful examination of the track of the œſophagus, we proceeded to the examination of the thorax and neck, and diſſected the œſophagus and ſtomach carefully out from their ſituation; previous to which a probang was paſſed down into the ſtomach, which met with no impediment whatever.

" When the ſtomach and œſophagus were diſſected out, we laid them open, and not the leaſt veſtige of diſeaſe, neither ſtricture, ſchirrus, ulceration, or even abraſion of the internal coat, appeared in either.

" We now ſought for the enlargement which occaſioned the particular feel behind the ſtomach and viſcera. This was no other than the ſpine itſelf, which formed a ridge from the neck to the laſt vertebræ of the back, and had more the feel of the ſpinal proceſſes of the back than the bodies of the vertebræ. Inſtead of the uſual form of the bodies of the vertebræ, as thus  the following was the form of them:



and the depth of the cavity, from the middle of the bodies of the vertebræ to the poſterior arch of the ribs, was at leaſt five inches.

" The protuberance was greateſt about the ſeventh vertebra of the back, where the œſophagus paſſes through the diaphragm. The liver and all the viſcera appeared ſound, the omentum was very thick and large, but did not appear ſchirrous. There were two biliary concretions in the gall-bladder the ſize of a large nutmeg each."

Dr. Helſham aſks how far will this particular form of the ſpine account for the ſymptoms ſhe had been ſubject to for five years?

Case. II. " R. C. eſq. aged 79, had been affected for twenty years with dyſphagia, which was ſuppoſed to have been firſt occaſioned by his eating a morſel of hot pudding, which by excoriating the inſide of the œſophagus, might have given riſe to ſtricture, or a fungous excreſcence on the part.

" For the laſt two or three years of his life I had frequent opportunities of being at table with him, and from the obſervation I then made on his manner of ſwallowing, and what I ſaw during the week preceding his death, I could by no means think that either ſtricture or fungus ſufficiently accounted for it.

"Excluſive of the difficulty of ſwallowing, in the firſt inſtance, he would ſome time afterwards (perhaps ten or fifteen minutes) regurgitate part of his food or drink back again, which ſeemed to have lodged ſomewhere in the paſſage.

"Excepting the difficulty of ſwallowing, he had enjoyed a very good ſtate of health, was of a fair, florid complexion, and rather inclining to corpulency.

"In January, 1792, the difficulty of ſwallowing increaſed to ſuch a degree, as almoſt totally to prevent any nouriſhment being received into the ſtomach; and, for the laſt ten days of his life, he was ſupported by broth clyſters, and at length gradually ſunk from inanition.

"During the laſt week of his life he would frequently, to appearance, ſwallow more than four ounces of liquid at a draught, which would remain ſometimes for five or ten minutes, and then be regurgitated.

"Permiſſion being obtained to open the body; after removing the larynx, pharynx, trachea, and œſophagus, an enlargement or protuberance of the body of the fifth vertebra of the neck, which projected above half an inch over the body of the ſixth vertebra, appeared to be the original cauſe of the complaint, by producing the ſtricture in the œſophagus. This bony projection did not ſhew any mark of diſeaſe further than its enlargement.

"The effort of ſwallowing had gradually produced a dilatation of the pharynx behind the œſophagus, and underneath the projecting body of the vertebræ, forming a ſac which would contain about four or five ounces, into which part of the food or drink eſcaped, and remained for ſome time, till by its irritation it produced an effort to reject it."

CHAP. XVII. OF THE DISEASES OF THE EAR.

Imperforated meatus auditorius.] SOMETIMES a *thin membrane* is ſpread over the mouth of the external paſſage, while at other times a conſiderable part of the paſſage is *filled up* with a fleſhy looking ſubſtance, occaſioning deafneſs. When the firſt circumſtance occurs, the ſkin is eaſily divided by a ſimple inciſion, and the accretion of its ſides may be prevented by a doſſil of lint or a bit of bougie inſerted between the edges of the wound, and daily cleaned and returned till the part be rendered callous.

When the other cauſe is preſent, the inciſion muſt be continued conſiderably deeper, till the reſiſtance be removed, or till the inſtrument reach near to the membrane of the tympanum, when the operator ſhould deſiſt, leſt the membrane ſhould be wounded: then the ſame kind of treatment may be followed as in the former caſe. The proper time for performing the operation is when children uſually begin to ſpeak; for previous to this the patient may be too weakly to bear it, and if too long delayed, the ſpeech would be impeded.

Sometimes the meatus externus is entirely wanting in the temporal bone. For this an opening through the maſtoid proceſs has been propoſed; but the operation has not been performed, at leaſt in this country.

Extraneous bodies in the ear.] Children ſometimes puſh *hard bodies* into the ear, or different kinds of *inſects* occaſionally creep into it, ſo as to cauſe conſiderable uneaſineſs. Subſtances lying near the outer end of the paſſage may generally be extracted by the ſmall forceps repreſented in Plate II. (fig. 48.); but round, hard bodies ſituated deeper in the paſſage are more readily removed by a crooked forceps. When inſects are deep ſeated in the ear, they ought firſt to be killed, by filling the paſſage with oil, or any other fluid which proves noxious to them, without hurting the tympanum. They may then be waſhed out by injecting warm water frequently by means of a ſyringe.

Deafneſs from wax.] The accumulation of wax is one of the moſt frequent cauſes of deafneſs, and it may be readily detected by looking into the ear in a clear ſunſhine.

Various methods have been propoſed for removing wax from the ear; but one, not inferior to any, is to throw in frequently, by means of a common ſyringe or bag, ſome warm milk and water, or water in which a little ſoap has been diſſolved. Aſſiſtance may likewiſe be given here, by uſing along with the injection a blunt probe or fine hair pencil, by which the bottom of the paſſage may be cleared out. After the wax is removed, the patient ought to guard againſt the effects of cold by introducing a little wool for ſome time into the meatus. When deafneſs is owing to a *deficiency of wax* in the ear, a little oil of almonds, or even oils of a hotter nature, or ſoap, or galbanum, &c. have been of ſervice.

Running from the ears.] Purulent matter is now and then formed in the ears of adults, but oftener in thoſe of children. Sometimes it is produced by ulcers ſituated in the lining of the meatus, or upon the membrane of the tympanum. It ſeems to be merely a local affection, and does not, as many have ſuppoſed, originate from a morbid ſtate of the ſyſtem. The remedies beſt calculated for removing it are ſuch as are of a moderately aſtringent nature, as a weak ſolution of vitriolated zinc. A little of this may be dropped in two or three times a-day, but it is ſtill better to uſe a ſyringe. If the diſcharge has continued long, it may be proper, in addition to the other applications, to keep open a ſmall bliſter for ſome time in the neck, arm, or wherever it may be thought moſt convenient.

In ſcrophulous habits, *ſuppurations* ſometimes occur in the neighbourhood of the ear, and penetrate into the external paſſage, or into the tympanum itſelf; after which it is not unuſual for the ſmall bones of the ear to loſe their connecting membrane, and to be diſcharged along with the matter, and for caries to enſue in the tympanum; in conſequence of which a high degree of deafneſs is produced, which can never be removed. In ſuch a ſituation little elſe can be attempted than to preſerve the parts clean and free from ſmell, which is readily done by injecting a little warm milk and water morning and evening by means of a ſyringe (fig. 54). If neglected, the matter from the carious bones is apt to become offenſive; and it commonly continues till the diſeaſed parts are either diſſolved and diſcharged, or probably during the life of the patient.

Deafneſs in old perſons.] It ſometimes happens, particularly in old people, that, from expoſure to a ſtream of cold air, the tympanum becomes affected, and a noiſe is heard by the patient like the ruſhing of water. In other caſes the patient is incapable of accurately diſtinguiſhing the words of ſome perſons ſpeaking in a loud tone of voice; or, in mixed companies he hears only a confuſion of ſounds. Complaints of this kind frequently originate from a relaxation of the ſoft parts of the tympanum; and though a complete cure is not eaſily performed, yet conſiderable advantage is ſometimes derived from the uſe of hot ſtimulating oils, and from keeping the part warm at the ſame time with a little wool. When deafneſs ariſes from affections of this nature, ſome aſſiſtance may be derived from collecting the ſound, ſo as to make a ſtronger impreſſion upon the internal ear. A variety of inſtruments have been invented for this purpoſe. Some uſe a well-known convoluted tube called an ear-trumpet; others a ſort of cup (fig. 49), which is concealed under the hair, and fixed to the head with ſprings.

Affections of the Euſtachian tube.] Beſides the affections which may ariſe in the meatus externus, and may be the cauſe of deafneſs, others may occur in or about the *meatus internus* or Euſtachian tube, which may have in part the ſame effect, though by no means in the ſame degree. Inflammation and its conſequences may originate in the cavity of the tube, or ſwellings or ulcers in the throat may affect it ſo as to cauſe ſome degree of deafneſs. When this is the caſe, it is practicable to introduce a pipe (fig. 50), crooked at the extremity, through the mouth or noſe, and then to inject into the mouth of the Euſtachian tube any mild fluid which may be thought fitteſt for the purpoſe, though too great dependence ſhould not be placed upon the attempt.

In the Memoirs of the *Medical Society of London*, Dr. Sims has clearly ſhewn the marks by which deafneſs is known to proceed from an obſtruction of the *Euſtachian tube*. Theſe are, 1ſt, Its being preceded by ſome of the cauſes already generally known, ſuch as *coryza*, enlargement of the tonſils, *aphthæ*, a want of ſecretion in the parts, &c. 2dly, When on an effort to expire, and at the ſame time retaining the breath by ſtopping the mouth and noſe, no preſſure is found upon the *tympani* of both ears. For if the tube be free, and the effort very conſiderable, the preſſure is ſo great as to be attended with pain, and to endanger the rupturing of the *membrana tympani*. And here the doctor remarks, that a preſſure upon the *tympanum* of one ear is not ſufficient, unleſs that preſſure be obſerved in each of the ears at different times, a thing not likely to happen. 3dly, The ſound of the deaf perſon's voice appearing dull, or otherwiſe different from what was uſual before, and alſo from the ſound of any other perſon's. This, however, is only remarkable where both tubes are ſtopt, as where one only is affected, the perſon's own voice is heard as well as formerly. 4thly, There ſeems always to be a noiſe heard by the patient, as if in his own ears. This ſometimes reſembles the hiſſing of a tea-kettle before it boils, at others it is a roaring like water, or like high wind blowing through trees, or even like thunder. This noiſe is heard when one ear only is affected, though perhaps not in the ſame degree. What may be thought to militate againſt this opinion, is the common experiment of ſtopping one or both ears, which immediately cauſes a ſounding in the head of the kind juſt mentioned: but it is to be conſidered, that in this caſe air is included between the finger and membrane of the *tympanum*, a thing which can never happen in diſeaſes of the external *meatus*, but is preciſely what happens in obſtructions of the *Euſtachian tube*. 5thly, Perſons deaf from this cauſe hear better in a carriage, or in any conſiderable noiſe. Dr. Sims is aware that this has been attributed by ſome to the tenſion given thereby to the muſcles of the ſmall bones of the ear; whether this, however, be not hypothetical, muſt be ſubmitted to phyſiologiſts. 6thly, When one tube is obſtructed, the hearing is much more impaired in proportion than when the external *meatus* of only one ear is ſtopt. This, however, is not to be underſtood of the ſound of the patient's own voice, which is perceived equally as before. And the doctor is led to conclude, that in all caſes of deafneſs, where one or both tubes remain open, and when the internal parts of the ear are not diſordered, perſons affected with this malady hear their own voices as well as formerly, and therefore we find them always ſpeaking in a lower voice than other people.

"After all I have ſaid, however," continues Dr. Sims, "of the diſtinguiſhing marks of the different ſpecies of deafneſs, there are caſes where it is very difficult to decide. And in many it appears evident that both the tube and the external *meatus* are affected, which is no more than what we perceive in diſeaſes of moſt other parts of the body; the parts in contiguity and connected with them becoming frequently affected.

" According to the different cauſes from which the obſtruction of the tube ariſes, the conſequent deafneſs is curable or otherwiſe. Where it is owing to any glutinous matter ſtopping the paſſage, or a ſimple ſwelling of the membrane which lines it, or a tumor in the neighbourhood, it is plainly within the reach of the medical art. To theſe cauſes I ſhall therefore principally refer in what is to follow.

" When it is ſlightly infarcted with this matter, the firſt and moſt ſimple way in which it is freed from it is by the action of ſwallowing. This ſeems to produce its effect by putting the anterior cartilaginous and membranaceous part of the tube in motion. That this part of the tube is moveable, or at leaſt contractible, all authors agree; and any perſon who will carefully attend to his own feelings, will perceive a peculiar ſenſation in his ear in performing deglutition. I have often found that a ſlight obſtruction in my ear has been removed by this effort, and therefore whenever I perceive the hearing ſtopt with a little ſinging in my head, I, as it were, mechanically perform it. Others, I doubt not, have experienced the ſame, though without taking notice of it, or knowing whence the benefit ariſes.

" Gaping, yawning, and gargling, have all been known to cure it, and probably act in a ſimilar manner to the laſt.

" Whatſoever forces a current of air into the tube, often removes deafneſs; and this will have its effect whether the diſorder proceeds from viſcid matter, as in the laſt caſe, or from a ſwelling and puffineſs of the *mucous* membrane. In the action of bawling or ſpeaking very loud, the air is forced out of the *thorax* with impetuoſity, and though part of it finds a vent through the mouth and noſe, yet ſome of it will paſs into any cavity that will admit of dilatation, which is the caſe of the *tympanum*, the membrane of which may be protruded conſiderably outward. Coughing has a ſimilar and more powerful effect, and ſneezing ſtill a greater; theſe have been therefore known often to give relief. The action of vomiting falls likewiſe under this head, although at firſt the propriety of placing it here may not be evident. It is, however, a compound action, for we not only evacuate the ſtomach, but at the ſame inſtant force the air out of the lungs with great violence, to prevent, I ſuppoſe, any of the matters then paſſing over the top of the *larynx* from dropping into the *aſpera arteria*. Another ſpecies of effort has been ſaid to cure this complaint, and may, I think, be ranked here, although the connection be leſs apparent than in the former caſe, that is, retention of the breath. After retaining the breath for any conſiderable time, we are obliged almoſt convulſively to expel it, the effect of which latter action has, I apprehend, been confounded with the former, by thoſe who have recorded its uſefulneſs in this diſeaſe.

" I have already mentioned that a ſwelling of the membrane which lines the inſide of the tube will cauſe deafneſs. This beſides may produce the former cauſe by thickening the *mucus* ſecreted there, as we moſtly ſee in inflammations of glandular parts. Whatſoever therefore aſtringes this membrane, or even the parts in contiguity with it, may be of ſervice. It is in this way that gargles may have cured the diſeaſe. Unloading the veſſels of this membrane is alſo evidently a natural and efficacious mode of cure. This may be accompliſhed by cupping, bliſters, or iſſues, in the neighbourhood, or by producing general depletion by purgatives, all of which modes have been ſometimes ſucceſsful. Under this head may alſo be arranged the advantage often perceived from wearing a flannel cap, or other warm covering of the head at night. Theſe latter remedies may likewiſe be combined with thoſe in the former paragraph, inaſmuch as the leſſening any ſwelling of the ſolids will make the obſtructing matter more eaſily removed.

" Syringing the external ear may ſometimes have been of ſervice from the effect of applications never being confined to the part alone which they touch, but being propagated to the contiguous ones, eſpecially thoſe parts immediately connected with them."

The laſt mode of cure noticed by Dr. Sims, is that by injections into the tube, either from the mouth or noſe. The injecting from the mouth he thinks rather impracticable; but from the noſe it has beyond a doubt ſometimes ſucceeded. On this ſubject we are referred to Mr. Wathen's paper in the forty-ninth volume of the Philoſophical Tranſactions.

Having noticed the various methods that have ſometimes been ſucceſsful in the cure of this diſeaſe, of which the ſimpleſt, and apparently the moſt certain and powerful, is the mode of injection, the doctor ſpeaks of the method preferred by himſelf, in the following way:

" All the other modes of cure mentioned," ſays he, " evidently fall ſhort in power and efficacy of the one mentioned (in a caſe before related), I ſhall therefore content myſelf with laying down ſuch further directions as I have ſince found uſeful in the proſecution of it. Perſeverance in repeating the efforts is very requiſite in this way, in the ſame manner as we ſee in reducing hernias, or in childbearing, a number of efforts ſucceed, any one of which ſingly appears of no ſervice whatever. Conſiderable force is likewiſe requiſite; indeed, I always order the force to be increaſed until the air is found to ruſh againſt the *membrana tympani*, and, by forcing it outward, to give pain. In caſes where only one ear is originally affected, I think it beſt to ſtop the other one externally with wax, or ſome other ſoft adheſive ſubſtance, whilſt uſing the efforts to expel the breath, leſt their violence might rupture the membrane of the *tympanum* of that ear in which the tube is free, or at leaſt give it conſiderable and unneceſſary pain. Where the deafneſs has been of long ſtanding, if the efforts made in this way do not ſucceed at firſt, I think it beſt to have recourſe to bliſters, or ſome of the methods mentioned in a preceding paragraph for emptying the veſſels of the tube, after which the efforts are renewed at times with ſuperior efficacy."

Theſe hints of Dr. Sims, induced Dr. Zencker of Berlin to communicate a few obſervations on ſome ſpecies of deafneſs, which he had ſuccesſfully treated, and which were communicated to the Medical Society.

"I take the liberty," ſays he, "of offering an obſervation taken from the late Mr. Schmucker's (a famous German ſurgeon) collection of chirurgical works relative to this kind of diſeaſe.

"A man living in Sileſia was for a long time deaf of both ears: all remedies applied by a ſkilful phyſician having proved ineffectual, he was left without relief, bearing his misfortune philoſophically. An inflammatory ſwelling afterwards roſe at the maſtoidæal proceſſes of each temporal bone: poultices and a gum plaſter were applied; fluctuation was felt; and, after opening, a good pus was diſcharged; two days afterwards the pus became thin and ill coloured, the ſurgeon diſcovered, with a probe, the bone naked and rough: the next day a decoction of bitter herbs was injected, and the injected matter partly came into the mouth: and in repeated trials ſtill more freely; the injection was carried on; four or five days after, the patient could hear a little; the power of hearing increaſed every day; a fortnight having elapſed, he could hear perfectly at that ear, and the wound ſoon cloſed. Encouraged by the ſucceſs attending this caſe, the ſurgeon, on the patient agreeing to his propoſitions, cut through the ſkin covering the maſtoidæal proceſs of the other temporal bone, and penetrated with the perforating trepan the external bony lamina covering the maſtoidæal cells: the above-mentioned injections were had recourſe to, which alſo found their way through the euſtachian tube to the mouth; the patient ſoon began to hear likewiſe at that ear; and a fortnight after the hearing of this ear was as well as that of the other, and the wound was healed up."

Dr. Zencker adds the following remarks:—"The organ of hearing," ſays he "may be divided into the external and the internal part, ſeparated by the tympanum; in either may reſide the cauſe of the loſs of hearing. Thick ear-wax in the meatus auditorius externus may eaſily be removed, and hearing reſtored; but various and very obſtinate are the affections of the internal ear, that is compoſed by the cavum tympani cohering with the maſtoidæal cells and the Euſtachian tube, by the veſtibulum, cochlea, and canales ſemicirculares." Mr. Cruikſhank cautiouſly deſtroyed the tympanum, malleus, and incus, in dogs; notwithſtanding which, they retained the power of hearing. From thence he infers, that, when the ſtapes remains at the foramen-ovale, and the auditory nerve is unhurt, the ſenſe of hearing will continue, though leſſened; but if the ſtapes, nerve, veſtibulum, cochlea, and canales ſemicirculares, are deſtroyed, there is an irrecoverable loſs of hearing."

Some think Mr. Wathen's method of injecting into the tube by the mouth or noſe, can very ſeldom be applied. Indeed, few patients can ſuffer the tickling of the noſe produced by the pipe of the ſyringe; and even the moſt ſkilful ſurgeon will ſometimes miſs the opening of the tube. But the injection by the mouth ſeems to us moſt free from theſe difficulties.

We have already noticed the impoſſibility of applying a remedy in caſes of organical deficiencies in the apparatus of hearing. The following inſtance of original deafneſs, however, with the appearances on diſſection, by Mr. Haighton, alſo publiſhed in the Memoirs of the Medical Society of London, are worthy of being conſidered by every ſurgeon.

The patient died when he was about thirty years of age. Having been deaf from his birth, he was conſequently dumb. He poſſeſſed, as might be expected, but little originality of genius, and his intellectual powers were very limited; but he was not deſtitute of talents for imitation.

Theſe were the appearances on diſſection. "The brain, which was carefully examined, exhibited nothing peculiar; nor did any thing worthy of notice occur, until, in the order of examination, we arrived at the ſeventh pair of nerves, which, from its function, is called *auditory*.

"This nerve conſiſts of two portions, one of which is called *portio dura*, from its firmneſs; but its connection with the ſenſe of hearing is ſomewhat remote; the other is called *portio mollis*, and is very properly conſidered the true auditory nerve. This laſt portion was remarkably ſmall; it did not appear to be half its uſual ſize; but the portio dura ſeemed in every reſpect natural.

"Having taken out the temporal bones in order to examine the parts more at leiſure, we found nothing preternatural in the meatus auditorius, membrana tympani, the cavity of the tympanum, or the two apertures leading from it, viz. the Euſtachian tube, and the communication with the maſtoid cells. The figure of the four bones of the tympanum was natural, and their relative ſituation very proper. The firſt of them, called *malleus*, was attached as uſual by its manubrium to the membrana tympani; and the laſt, called *ſtapes*, had its baſis reſting on the entrance of the veſtibulum, called feneſtra ovalis.

"Every appearance hitherto was natural.—The ſole cauſe of deafneſs was found in the labyrinth.

"This part of the organ, conſiſting of the veſtibulum, cochlea, and ſemicircular canals, was perfectly formed; but inſtead of containing water, was filled with a ſolid caſeous ſubſtance. This, which was the only preternatural appearance, will be very ſufficient to explain the caſe, when we conſider the economy of this organ."

The author remarks, that, "The organ of hearing, inſtead of being divided into external and internal, may, perhaps with more propriety, be diſtinguiſhed into parts preparatory to the impreſſion of ſound, and parts more immediately ſubſervient. Under the firſt claſs may be ranked every part except the labyrinth, as the meatus auditorius, membrana tympani, the cavity of the tympanum, with its apertures and contents. Under the laſt claſs may be conſidered the labyrinth and its contents.

"In the preſent caſe, the firſt of theſe claſſes appeared very perfect: the meatus auditorius conveyed the tremulous motions of the air to the membrana tympani, which again, by the communication of the malleus, incus, os orbiculare, and the ſtapes, conveyed thoſe movements to the labyrinth.

"The Euſtachian tube being pervious throughout its length, performed its office, viz. that of preſerving the balance between the air on the outſide of the membrana tympani, and that in the cavity of the tympanum, by which means that membrane is allowed to vibrate in a more perfect manner.

"It is not altogether certain that an obſtructed Euſtachian tube will produce total deafneſs, though it may diminiſh that ſenſe in a very high degree, in proportion as the freedom of vibration of the membrana tympani is impeded.

"But if it could be clearly proved that a total deafneſs aroſe from this cauſe; and if it were likewiſe poſſible to aſcertain this in a living ſubject; there is a probability of obtaining relief from an operation. The moſt natural idea in ſuch a caſe would be to reſtore the natural opening by the introduction of inſtruments up the noſe. But the diſtant ſituation of the orifice of this tube from the entrance of the noſtril, together with its being out of ſight, create a difficulty; and it is probable that our attempts in this way might be in vain. There remains, however, another expedient. It is well known that the maſtoid proceſs of the temporal bone is internally compoſed of large cells, which have an opening of communication with the cavity of the tympanum in a manner ſimilar to that of the Euſtachian tube: in ſuch a caſe a perforation might be made into that proceſs, and the communication between the external and internal air be again reſtored.

"In recording the appearances on diſſection," continues Mr. Haighton, "the diminiſhed ſize of the auditory nerve was noticed. Is this to be conſidered as a cauſe of deafneſs, or as an effect? I ſhould imagine the latter. For if it were the cauſe, we ſhould naturally expect the effect to be in proportion; and inſtead of a total deafneſs, there ſhould have been only a partial one. It is moſt probable that its connection, in this caſe, is only an effect; for it is a law in the animal economy that parts increaſe in bulk from moderate uſe, and become diminiſhed from the want of it. This is very evident in the muſcles, where, from a diſeaſed joint which prevents motion, the whole limb is obſerved to ſhrink.

"I have known the ſame thing take place in the optic nerve, where there had been an accidental blindneſs. I ſhould therefore conſider this as the *effect*, and not the cauſe."

In tracing the phenomena of the ſenſe of hearing, it is of ſome importance to notice the diſcovery made by Mr. Aſtley Cooper, of London, that the imperfect ſtate, or even the total deſtruction, of the *membrana tympani* does not produce deafneſs, nor even materially derange the natural functions of the ear. For information on this ſubject, however, we refer the reader to Mr. Cooper's papers in the Philoſophical Tranſactions.

SECT. II. *Of the* TOPICAL REMEDIES *to be employed in Diſeaſes of the* EAR.

We have already ſhewn that the functions of the ear may be injured by wounds, ulcers, or any thing that hurts its fabric. The hearing may likewiſe be hurt by exceſſive noiſe; violent colds in the head; fevers, hard wax, or other ſubſtances ſticking in the cavity of the ear; too great a degree of moiſture or dryneſs of the ear.

When deafneſs proceeds from cold applied to the head, the patient muſt be careful to keep his head warm, eſpecially in the night; he ſhould likewiſe take ſome gentle purges, and keep his feet warm, and bathe them frequently in lukewarm water at bed-time. When deafneſs is the effect of a fever, it generally goes off after the patient recovers. If it proceed from dry wax ſticking in the ears, it may be ſoftened by dropping the following ſolution into them:

(No. 86.) ℞ Natri muriat. ʒj.
Aquæ fontis ℥j. Miſce.

In a day or two afterwards the ear muſt be ſyringed with warm water.

If deafneſs proceed from dryneſs of the ears, which may be known by looking into them,

(No. 87.) ℞ Linim. ſaponis ʒj.
Aquæ diſtillat. ʒiij. Miſce.

A few drops of this may be put into the ears every night at bed-time, ſtopping them afterwards with a little wool or cotton. Some, inſtead of oil, put a ſmall ſlice of the fat of bacon into each ear, which is ſaid to anſwer the purpoſe very well.

When the ears run much, or abound with moiſture, beſides an iſſue or ſeton, which ſhould be made as near the affected parts as poſſible, the ears ſhould be thoroughly waſhed every day with a large camels-hair pencil dipped into warm water.

Some recommend the gall of an eel mixed with ſpirit of wine, to be dropped into the ear; others, equal parts Hungary-water and ſpirit of lavender. Etmuller extols amber and muſk; and Brookes ſays, he has often known hardneſs of hearing cured by putting a grain or two of muſk into the ear with cotton-wool. Where, however, an application with conſiderable ſtimulant power is neceſſary, camphorated oil, with the addition of a few drops of volatile alkaline ſpirit, may be conſidered as one of the beſt. It is proper, however, to begin with a ſmall quantity of the alkali, increaſing it as the ear is found to bear it. The following formula is uſed at St. Thomas's hoſpital, under the name of *Guttæ accouſticæ:*

(No. 88.) ℞ Ol. Amygdal. ʒiij.
Aq. ammon. ʒj. Miſce.

In ſome inſtances, where deafneſs depend on a ſtate of inſenſibility in the nerves, electricity, particularly under the form either of ſparks or of the electric aura, has been employed with great ſucceſs. But theſe and other applications muſt be varied according to the cauſe of the diſorder, which however is always difficult, and often impoſſible, to aſcertain.

Mr. Maule for theſe purpoſes recommends a mixture of oil of almonds and ſpirit of turpentine, in ſuch proportions as may juſt afford an adequate ſtimulus to the part.

SECT. III. *Of the* MECHANICAL MEANS *by which the hearing may be aſſiſted in Caſes of* DEAFNESS.

WE have hinted above at the methods uſually practiſed by deaf perſons to aſſiſt their hearing, and theſe are too well known to require a particular deſcription. The following remarks, however, of Prof. Arneman, on Acouſtic tubes, being both new and important in a practical view, we have thought their introduction here indiſpenſably neceſſary.

The beneficial uſe of acouſtic tubes, or *hearing trumpets* as they are popularly called, depends on two points; 1. That the ſound is put into a ſtronger vibrating motion through the medium of the metal, and at the ſame time; 2. That a reſonance, and new reflection of the ſound, is produced.

The ſound increaſes and becomes ſtronger by theſe inſtruments, but if they are not properly conſtructed, it is likewiſe made leſs diſtinguiſhable. The beſt acouſtic tubes are the moſt ſimple ones, either quite ſtraight, or with a little curvity. It is alſo eſſential, they ſhould have a wide opening to receive a greater portion of ſound, and by which it is brought at the ſame time more condenſed to the organ of hearing. Thoſe that are much curved, have no great effect, and likewiſe the inconvenience that on account of their curved line they cannot be worked ſo even by the artiſt. The ſame may be ſaid of the conoidical tubes, in which the ſound ceaſes to be reflected at the place where the angle grows greater than a right one, and becomes retrograde; becauſe, according to Mr. Lambert's Obſervations on Acouſtic Inſtruments (a German work), the angles of reflection increaſe like unequal numbers; and the laſt which can be admitted, muſt not exceed 90°. The form of an entire cone, is therefore by no means calculated for propagating the ſound, which, having entered, goes out again, without reaching the top of the cone The parabolic form is the fitteſt for the conſtruction of acouſtic tubes, into which the ſound enters in a direction parallel with the axis, and is by reflection concentrated as it were in a focus. Acouſtic inſtruments with an hemiſphere to them, are inferior to theſe, becauſe the ſound is only reflected from the centre, and at the ſame time not ſo eaſily intercepted.

However, it ſeems that the conſtruction of theſe inſtruments has not been brought to ſo great a perfection, as not to admit ſome improvements founded upon practice and experience. For the purpoſe of promoting this, Mr. Arneman intends to give, by degrees, figures and deſcriptions of thoſe that have proved moſt uſeful by experience, and he invites all practitioners in Germany, who have had an opportunity of making obſervations to this ſubject, to communicate any inſtrument of the kind they have applied with ſucceſs, by which means much would be contributed to a more perfect and ſure method of diminiſhing thoſe inconveniences ariſing from difficult hearing, for which ſo many ſeek advice and relief in vain, againſt an evil, which makes men unfit for enjoying life from the moſt intereſting mean, that of communicating and receiving ideas by word of mouth. The public would be much benefited if the practitioners of this country would impart their experience on the ſubject, and contribute to ſuch an uſeful and humane undertaking.

The inventor of the inſtrument repreſented in Plate V. is not known, but it belongs certainly to the beſt of the kind that has been contrived. It is made of thin braſs or copper, and ſhould not weigh more than eight ounces, whereby it becomes very portable, and may as well ſerve for the right as for the left ear. To enable any artiſt to make this inſtrument accurately, it has been thought proper to add the dimenſions of the different parts of which it is compoſed. H G I F is the cup, of which H I has 3 Paris inches 6 lines in diameter. F G = 2 Paris inches 10 lines. H F is = 3 Paris inches 1 line. F G is the bottom of the cup, which muſt particularly be made with exactneſs, becauſe the uſe of the inſtrument depends in a great meaſure on its conſtruction. It may be made as the ſegment of a circle whoſe radius is = 2 inches 7 lines Paris; but it is ſtill better to give a parabolic form to the ſegment, whoſe focus is 1 inch Paris. For this purpoſe it is neceſſary to work after a certain model or ſtandard, of which fig. 2 gives an idea, after which the bottom muſt be accurately made. The inſide ought to be ſmooth and well poliſhed, the whole afterwards ſoldered on, when the inſtrument is put together. The others are, that which receives the ſound, D E, and the conducting tube, which carries it to the ear, K L B. The former is to be performed in the ſame parabolic form as the bottom of the cup, and muſt therefore be exactly worked after the above fig. 2, except that its chord is by 4 or 5 Paris inches ſmaller than the bottom. In the middle of this part, D E, a hole is made, whoſe diameter is 1 Paris inch 2½ lines, which is at the ſame time the lower diameter of the tube K L, its upper diameter in A being only 6 lines. The length of the tube from K L to A, is 5 inches 10 lines. This muſt now be bent in ſuch a manner, that K L and A make an angle of 90°. Being well poliſhed inſide, the part D E is ſoldered into it, and the whole conducting tube faſtened to the cup in I L, ſo that D E is equally diſtant from all ſides of the cup in an exact horizontal direction, and the focus of the part D E likewiſe ſufficiently diſtant from the focus of the bottom. In A another piece of tube is put on, of 9 inches in length, and faſtened to it by means of a ring on the former A, at the diſtance of 1 inch from its end, with an opening in its periphery, through which a hook may paſs, and turning this afterwards, the tube becomes one contiguous piece. On the curvation in B, a top of bone, ivory, or horn is put, to prevent the ear being irritated and inflamed, which may otherwiſe be cauſed by the metal. The laſt part is the cover, H I, perforated with holes, of which fig. 3 ſhews the profile. The part A B being taken off, the inſtrument may be conveniently carried in the pocket. It can alſo be faſtened to the body by ribbands, by means of two clinchers in M N, and thus even uſed in going a-ſhooting, &c.

Prof. Arneman proceeds to examine the different inſtruments that have been propoſed as hearing-trumpets. The inſtrument, fig. 3, has been much recommended, though it appears from its conſtruction to be far inferior to that we have already deſcribed. It conſiſts of a hemiſphere made of braſs, ABC, fig. 1, whoſe radius is $= 23'''$ Paris lines, and its diameter conſequently at $AC = 2 + 23''' = 3''$ inches $10'''$ lines. On it is faſtened the cover, which is convex, and perforated with many holes. At CK is an opening $11'''$ in diameter, into which goes a conical conducting tube, $16''$ long, the diameter of which has, at GZ, $= 10'''$, and its opening at OP, $= 4'''$. For greater convenience, the tube may be taken in pieces, as appears at NMC. At OP, or that part of the conducting tube which is applied to the ear, it ends in a top, which is generally made of tin, for the purpoſe of ſhutting the meatus auditorius; but as experience has ſhewn, that the continual touching of a metal generally hurts the ear, it would be adviſable to have the top made of ivory, bone, or horn. The conducting tube penetrates into the middle of the hemiſphere, where it is cut off in an oblique direction FG, to which is ſoldered a conical receptacle, the bottom of which is oval, as is ſeen in fig. 1, HJK. This receptacle is intended for intercepting the ſound, when it is reflected from the interior ſurface of the hemiſphere; but as it ſeems to be placed in a wrong poſition, it is more calculated to confound the ſound, than to conduct it properly. In order to convince the reader of what we have here ſtated, and to ſhew, that from the conſtruction of that inſtrument it is impoſſible it ſhould anſwer its purpoſe, fig. 2 is added, to demonſtrate how the reflection of the ſound proceeds: it repreſents the ſame acouſtic tube, likewiſe how the rays of ſound fall in, and how they are again reflected; theſe are figured in ABCDEF. It ought here to be firſt conſidered, that the point of concentration of the rays of light, as well as of ſound, fall into the middle of the radius of the inner ſuperficies of a globe, which is in this figure at O. This, however, is only the caſe with rays that fall in near the axis; the reſt are not ſo far propagated, declining the more and more from that point, by which means a confuſion and want of diſtinction is produced. Hence it appears, that the conical receptacle HIK, intended for the interception of the ſound, has not the proper form, but that the rays, before they reach it, diverge, and that the ear, for being able to underſtand every thing clearly and accurately, ought to be placed at O. The hemiſpherical form is likewiſe of no utility; and by examining the reflection of ſome rays, it will be ſhewn, that it is not proper to convey the ſound clear and accurate. The ray *f* for inſtance, is reflected in the ſame direction as it comes in. A, a ray more diſtant from the centre, is reflected at *a*, and conſequently does not reach that point where it could be conducted by the intercepting receptacle: the ſame may be ſaid of B*b*, which being rebounded againſt the oppoſite ſide, paſſes out in the ſame direction it fell in. From this it will be underſtood that all rays from A to B are of no uſe at all, but rather confound the ſound; and thoſe that fall in from B to C ſpring back in the ſame direction they came in, without affecting the ear at all. The ray C is therefore the firſt that touches the receptacle, and gets into the conducting tube, though it is likely to be diſperſed by being reflected with very acute angles, as is ſeen in fig. 2, at *ccc*. The ray D rebounds alſo againſt the tube, but is reflected with larger angles, increaſing by degrees; whence it appears, that the conducting tube muſt always be of a determined length, if the ſound is to be perceived by the ear. The line *ddd*, ſhews the reflection of this ray: the direction in which the ray E is reflected, is ſeen in *ee*. This may ſuffice to ſhew, that only a ſmall part of the rays of ſound, which fall in between C and D, are properly conducted and perceived by the ear, the reſt becoming quite uſeleſs. This inſtrument ſeems, therefore, not to be properly calculated to convey the ſound clearly and diſtinctly to the organ of hearing; a ſtatement which experience has likewiſe confirmed, as it was uſed by ſeveral people without the expected ſucceſs.

CHAP. XVIII. OF THE WRY NECK.

WRY NECK may be owing to different cauſes; as contraction of the ſkin in conſequence of burns, or other kinds of ſores; relaxation of the muſcles on one ſide of the neck, particularly the maſtoid, while thoſe of the other ſide continue to act with vigour; preternatural contraction of the muſcles of one ſide of the neck, the others having their uſual power; or, a bend in the vertebræ of the neck.

When the diſeaſe is owing to a contraction of the ſkin, this is to be divided through the whole of the contracted part, guarding againſt cutting the external jugular vein. When the contraction of the maſtoid muſcle is the cauſe of the diſeaſe, the muſcle ſhould be divided by gentle ſtrokes, ſo as to run no riſk of wounding the great veſſels ſituated under it. When an inciſion is made either with a view to divide the muſcle or the ſkin, the head is afterwards, by means of a machine (fig. 52), to be kept in a proper poſture during the cure until new granulations form and fill up the empty ſpace. When the diſeaſe is merely owing to a curve of the bones of the neck, the ſame kind of machinery may be uſeful with that recommended for cure in the other parts of the ſpine. But ſometimes the diſeaſe ariſes from an affection of the bones of a more ſerious nature. Here the diſeaſe in the vertebræ commonly begins with a ſlight pain, which gradually becomes worſe, and the head is turned over to the ſound ſide. As the diſeaſe becomes worſe, a fulneſs can be obſerved very painful to the touch; and moving the head becomes ſo diſtreſſing as to be almoſt impracticable. The only method which has been found to be effectual in this caſe, is the inſertion of a pea-iſſue on each ſide of the tumor, and retaining it till the pain and ſtiffneſs are entirely removed.

CHAP. XIX. OF BRONCHOTOMY AND ŒSOPHAGOTOMY.

1. THE operation of BRONCHOTOMY is an inciſion made in the trachea, to make way for air into the lungs, when reſpiration is obſtructed to ſuch a degree that life is in danger. If the patient's breathing be already ſtopped, the operation ought to be done with the greateſt expedition: uſing any inſtrument which will moſt readily make an opening in the trachea, as the delay of a few moments will often put a period to the perſon's exiſtence. Experience has ſhewn, indeed, that in by much the greater number of caſes, by a total ſtoppage of reſpiration for only five or ſix minutes, life is irrecoverably deſtroyed.

In performing the operation, where, from the nature of the caſe, ſufficient time is allowed, the patient is to be laid on his back upon a table, and properly ſecured by aſſiſtants. A longitudinal inciſion is to be made, about an inch and an half long, through the ſkin and cellular ſubſtance, beginning at the under edge of the thyroid cartilage; the ſterno-hyoid and thyroid muſcles are then to be ſeparated; the thyroid gland is to be avoided as much as poſſible, on account of its vaſcularity. As ſoon as the trachea is laid bare, the bleeding veſſels, to prevent coughing, are to be ſecured; then, with a common lancet, a puncture is to be made as high as may ſeem practicable between two rings of the trachea, of ſuch a ſize as to admit the introduction of a double canula (fig. 53), large enough to allow the patient to breathe freely, and of ſuch a length as neither to be in danger of ſlipping out, nor of irritating the back part of the trachea. Such a canula has long been recommended by Doctor Monro in his Courſe of Surgery. Previous to its introduction the canula may be put through ſeveral folds of linen compreſs, or theſe may be firſt ſlit half way down and applied, ſo that any of them may be removed and replaced at pleaſure. This double canula is to be fixed by a ſtrap round the neck; and when mucus obſtructs the paſſage of the inſtrument, the inner tube can be withdrawn, cleared, and readily replaced; while the patient is, during this time, breathing through the outer one, and by means of a ſcrew the tubes can be regulated according to the motions of the trachea. After the canula is fixed, it ought to be covered with a piece of muſlin or crape, to prevent the admiſſion of duſt, inſects, &c. As ſoon as the cauſes inducing ſuffocation are removed, the canula is to be withdrawn, and the ſkin immediately brought over the orifice, and retained there by a ſlip of adheſive plaſter.

2. By ŒSOPHAGOTOMY is underſtood the cutting open the œſophagus, to allow ſubſtances ſticking in it, and which cannot be extracted otherwiſe, to be removed. It is only to be done, however, in caſes of the moſt extreme danger, as it is attended with much hazard; and there are only two inſtances yet on record of its having been performed with ſucceſs, though there are ſeveral inſtances of wounds in the œſophagus being healed. The operation may be rendered neceſſary, where obſtructions of the œſophagus become ſo complete as to prevent the paſſage of nouriſhment into the ſtomach, or of air into the lungs. But it is evident, that when the obſtructing cauſe is in the lower end of the œſophagus, any inciſion becomes uſeleſs.

In performing the operation, the patient is to be ſecured in the ſame manner as for bronchotomy, and an inciſion made through the ſkin and cellular ſubſtance as directly oppoſite as poſſible to the part obſtructed. If it be done with a view to remove an obſtruction, the muſcles over the trachea are to be pulled to one ſide, and the trachea to the other, by means of a blunt hook; by which the œſophagus will be brought into view. If the obſtructed part now come in ſight, the inciſion is to be made directly upon the obſtructing body, which is to be extracted by a pair of ſmall forceps; but if the obſtruction happen to be further down than we can with ſafety have acceſs to the œſophagus, the inciſion is to be enlarged as much as poſſible, that the forceps may be able to reach and extract it. When the operation is performed, the wound will be difficult to heal, as the ſides of it will be frequently ſeparated by the action of deglutition. On this account as great a degree of abſtinence as poſſible is to be adviſed; and nothing but nouriſhing liquids, in ſmall quantities, are to be allowed. The patient ſhould be prevented from moving his neck; and the wound is to be healed as ſoon as poſſible by the ſame methods which are uſed with wounds in other parts of the body. On the other hand, if the operation has been done for the purpoſe of conveying nouriſhment into the ſtomach when the patient was diſtreſſed by a tumor either in the œſophagus itſelf or in ſome of the neighbouring parts, it will be neceſſary to keep the wound open during the continuance of the tumor, or the life of the patient.

CHAP. XX. Of SORE NIPPLES.

Women are more generally affected with ſore nipples in ſuckling their firſt child than at any period afterwards. This may, in ſome meaſure be owing to the ſmallneſs of the nipples; but very often it ariſes from their being unaccuſtomed to the irritation of ſucking. In ſome caſes, the nipples are ſo flat, and ſo much ſunk in the breaſt, as to render it difficult for the child to lay hold of them. Here aſſiſtance can ſometimes be given, by the mother preſſing back the prominent part of the breaſt, ſo as to make the nipple project between two of her fingers. Should this be inſufficient, the nipple may be made to project by applying to it a ſtout child ſeveral months old: but when this cannot be done, breaſt-glaſſes may anſwer the ſame purpoſe. By applying theſe to the nipple, and ſucking out the air, the child will commonly be enabled to lay hold of it.

The nipples at this time are liable to *excoriations*, cracks, or chops; which, though not attended with a formidable appearance, are frequently more diſtreſſing than large ulcers. Aſtringent applications are moſt to be depended upon in ſuch complaints; particularly a ſolution of vitriolated iron in water. Sometimes port wine, brandy properly diluted, or lime-water, are of ſervice; all of which ought to be applied warm. After bathing the parts with any of theſe, the nipple ſhould be covered with ſpermaceti ointment; but the firſt remedy is conſidered beſt. Even a little ſoft pomatum frequently rubbed upon the part, and covered with a ſoft linen rag, is ſometimes found to give conſiderable relief. But the nipple ſhould be perfectly cleared of theſe applications before the child is laid to the breaſt; and this may be done with a little port wine, or equal parts of brandy and vinegar. If proper attention be paid to theſe remedies, they will commonly be found to have the deſired effect; but if the contrary ſhould happen, another remains to be mentioned, which, in different inſtances, has given great relief: it conſiſts in the application of a thin ſkin to the nipple, as the neck and part of the body of a ſwine's bladder with an aperture in it; which being properly moiſtened and fixed to the breaſt, will completely protect it in the time of ſucking. Some indeed have employed a ſmall teat taken from a cow, annexing to the thick end a hollow grating of ſilver, which receives the nipple. This is drawn by the mouth of the child very effectually, the teat, when not in uſe, being kept in gin to prevent its putrifying. As long as the nipples remain any way affected, ſmall cups of glaſs or tin are uſeful for retaining the dreſſings, defending the nipples from the friction of the clothes, and receiving any milk which may fall from the breaſt.

For ſome further remarks on this complaint, ſee our ſubſequent volume on MIDWIFERY.

CHAP. XXI. OF PARACENTESIS OF THE THORAX.

WHEN either the action of the heart or of the lungs is impeded by fluids collected in the cavity of the pleura, a diſcharge of theſe fluids by a perforation is the only chance the patient has for relief. The fluids which collect in the pleura are, ſerum, blood, air, or pus. A collection of water or ſerum is frequently found in the thorax, combined with dropſy in other parts of the body; but the affection is often local, and it is then chiefly that advantage is to be derived from an operation. Beſides the two great cavities of the thorax, collections of water are frequently met with in the pericardium, and are ſaid to be ſometimes diſcovered between the layers of the anterior mediaſtinum.

Symptoms.] The diſeaſe is marked by the following ſymptoms: there is a ſenſe of weight or oppreſſion in the thorax, and difficulty of breathing; the patient has frequently a more uneaſy ſenſation in one ſide than in the other; has ſudden ſtartings during ſleep with a ſenſe of ſuffocation; is troubled with a frequent dry cough; the pulſe is ſmall and irregular; the ſkin dry, and the urine ſcanty.

With theſe ſymptoms there are commonly other marks of dropſy; and the patient ſometimes, upon any ſudden motion, is ſenſible of an undulation within the cheſt: and when the quantity of water is conſiderable, the undulation will even be heard by the byſtanders, if the body be ſmartly agitated. For this purpoſe, the patient's body ſhould be uncovered while under examination; and the ſurgeon ſhould place his hand upon the breaſt near the ſternum; then an aſſiſtant ought to raiſe the patient ſuddenly from an horizontal to an erect poſture, or to ſtand behind the patient and make ſudden jerks; when, if water be preſent, the undulation will be felt; but it is neceſſary to guard againſt being deceived by the noiſe ſometimes made by the contents of the ſtomach.

When the water is collected on one ſide only, if the diſeaſe be of long ſtanding, for the moſt part that ſide is more prominent than the other. If the water be in the pericardium, the ſymptoms are nearly the ſame as thoſe above enumerated, with this difference, that the pain is generally felt behind, and to the left ſide of the ſternum;

and the ſtroke of the heart is as if buried in water, while an undulatory motion has been ſaid to be felt oppoſite to the anterior extremities of the third, fourth, and fifth ribs.

Treatment.] In the treatment of this diſeaſe, little advantage can be derived from internal remedies. Squills, cream of tartar, mercury, and digitalis, are on ſome occaſions attended with advantage; but the only method from which we can expect any degree of ſucceſs, is the removing of the water by an operation, which ſhould be performed as ſoon as there is reaſon to expect that danger may ariſe from delaying it longer. The operation is done in the ſame way as ſhall be afterwards deſcribed in the caſe of empyema.

Blood in the thorax.—Blood collected in the cheſt is always extravaſated through ſome wound or rupture of the veſſels of the lungs or thorax. The breathing becomes oppreſſed, the motion of the heart and arteries feeble and irregular, and all theſe ſymptoms are more diſtreſſing than collections of other fluids. As it frequently happens, in caſes of this kind, that ſome of the veſſels of the lungs are injured, part of the blood is thrown up by coughing; which, when conſiderable, gives a temporary relief to the lungs and heart; and while this is the caſe, no operation is neceſſary; but whenever the action of theſe parts becomes much impeded by a great accumulation of blood, a perforation ought to be made to diſcharge it. When the extravaſated blood is too firmly coagulated to paſs off by a perforation, the wound ought to be made conſiderably larger; and if this be inſufficient, injections of warm water ought to be thrown in, and allowed to remain for ſome time, to promote the diſſolution of the maſs, which is afterwards to be evacuated. If the extravaſation has been occaſioned by a wound in the lower part of the thorax, a new perforation will be unneceſſary; an enlargement of the wound will be quite ſufficient. But if it be ſituated in the upper part of the cavity, a perforation in the middle and lateral part of the thorax ought to be made, that the blood may be freely diſcharged. In caſe of a rib being fractured, or a veſſel ruptured, the inciſion ought to be made as near as poſſible to the part affected, to allow the blood to eſcape, and looſe pieces of bone to be removed.

Air in the thorax.—The diſcharge of air into the cavity of the thorax produces ſymptoms little leſs alarming than thoſe proceeding from the effuſion of blood. In general they are, oppreſſion in breathing; a tightneſs of the breaſt, attended with pain; inability to breathe in the recumbent poſture; a fluſhing and ſwelling of the face; a feeble, and at laſt an irregular, pulſe; the extremities become cold, and cold ſweats break out on the forehead. With theſe ſymptoms there is frequently a ſwelling over the external parts of the body, by air getting from the ruptured lungs into the common cellular ſubſtance; and all theſe complaints increaſing, the patient, if not quickly relieved, ſoon dies; ſometimes in a few hours, with marks of ſuffocation.

Air may be produced in the cavity of the thorax by wounds in the lungs, by mortification generating air in any of the thoracic viſcera, by eroſion of ulcers, by laceration in conſequence of fracture in any of the bones of the thorax.

We diſtinguiſh this from other collections by the ſudden oppreſſion in breathing, by the fluſhing of the face, by no blood being thrown up, and by the emphyſematous ſwelling of the cheſt and other parts, which gives a crackling noiſe upon being preſſed.

The treatment of this complaint conſiſts in making ſmall punctures in the affected part of the ſkin, ſo as to allow the air to eſcape from the cellular ſubſtance: and if the air ſhall have ſpread to diſtant parts of the body, it will eſcape moſt readily by ſuch openings. But if this give no relief to the oppreſſed breathing, paracenteſis ought to be performed. In former times, patients labouring under ſuch ſymptoms were almoſt conſtantly left to their fate. Within theſe few years, however, ſome caſes have occurred where the patients have been completely relieved by an operation being performed. This is done in the ſame way as in the evacuation of other fluids.

Empyema.—Purulent matter is more frequently collected in the thorax than any other fluid: it is much more frequently formed, however, than confined there. As the matter is uſually ſpit up as faſt as it is generated, in the diſſections of thoſe who have died of this ſpecies of conſumption, much extravaſated pus is rarely found in the cavity of the thorax, though a great portion of the lungs be deſtroyed. Caſes not unfrequently occur, however, which require the operation; and theſe may be diſtinguiſhed by the following ſymptoms: the patient at firſt generally complains of a fixed pain in ſome part of the thorax, attended with heat, quick pulſe, and other ſymptoms of inflammation; reſpiration becomes oppreſſed; he is unable to lie on the ſound ſide; or, if both ſides be affected, can only lie on his back; has a conſtant tickling cough, clammy ſweats, frequent rigors or ſhiverings. If theſe ſymptoms be attended with an enlargement of the affected ſide, or with a ſoft œdematous fulneſs there, and, along with theſe, if there be a ſenſible undulation of a fluid, it may be concluded that a collection of matter is formed. The matter is commonly firſt formed in the ſubſtance of the lungs, and is afterwards diſcharged into the cavity of the pleura, though in many inſtances large quantities of purulent matter have been found to originate from an inflamed ſtate of the pleura.

Method of operating.—The operation ought to be performed as ſoon as there is evidence of the collection being the cauſe of the oppreſſed breathing, and that there are no ſigns of this being relieved by expectoration. The operation ought to be done upon the part where the collection is ſuppoſed to be ſituated; and this may be known by the ſeat of the previous pain, and perhaps by the matter being diſtinguiſhed between two of the ribs. If no matter flow, it is probably ſeated in the ſubſtance of the lungs; but even in this caſe, ſuch an opening may be uſeful, by taking off the ſupport, and giving the abſceſs an opportunity of burſting. If the undulation of the fluid be general, the operation is to be performed in the following manner: the patient is to be laid in an horizontal poſture, with the affected ſide inclining a little over a table. An inciſion is then to be made with a ſcalpel through the ſkin and cellular ſubſtance, between the ſixth and ſeventh ribs, and half way between the ſpine and ſternum, from one to two inches in length, and in the direction of the ribs. The muſcles are then to be cut through, keeping as near as poſſible to the upper edge of the inferior rib to avoid wounding the intercoſtal veſſels and nerves. As there is no occaſion for the bottom of the wound being of the ſame length with the external inciſion, it may be gradually contracted, ſo as at laſt to be only about the half. The pleura being now expoſed, is to be divided by ſlight ſcratches, taking the aſſiſtance of a furrowed probe to prevent the lungs from being injured, in caſe they ſhall be found adhering to the ribs. If the contrary takes place, the fluid will ruſh out immediately upon a ſmall opening being made into the cavity of the thorax; but if an adheſion appear, and if it be ſlight, which may be known by the introduction of a blunt probe, as much of it may probably be ſeparated as to allow the fluid to eſcape. In caſe it be conſiderable, the inciſion is either to be continued a little nearer to the ſternum, or an attempt made in ſome other part. After the fluid is obſerved to flow, it will be proper to introduce a ſilver canula (fig. 55) at the opening; by which means it will run more readily off, or can be more eaſily ſtopped in caſe the patient become faint. If the quantity of fluid be not conſiderable, it may generally be drawn off at once; but if it be great, partial evacuations ought to be made at different intervals, as circumſtances may direct.

The canula therefore ſhould be ſo formed, that, by means of a ſtrap put round the body of the patient, it can be readily ſecured. Its mouth is to be ſtopped by means of a cork. A pledget of emollient ointment is to be laid over the wound; and the whole being fixed by a napkin and ſcapulary bandage, the patient ſhould be laid to reſt. The remainder may be drawn off, probably in a day or two, or as ſoon as it is ſuppoſed the patient can bear it. After the fluid is carried off, the canula is to be withdrawn and the wound healed; or in caſe the operator be afraid of bad effects being produced upon the lungs by irritation from the canula, though of this this there will be little danger, as the lungs will generally be out of its reach, the ſkin may be ſo drawn back before the firſt inciſion is made as afterwards to ſerve the purpoſe of a valve. And for ſome days after the operation, the inciſion in the integuments may be brought oppoſite to that in the pleura, to allow the matter to run off, or to produce a radical cure by exciting a certain degree of inflammation over the lungs and inſide of the thorax.

After the matter is evacuated, the wound ought to be kept open a conſiderable time, for the purpoſe of diſcharging the matter as faſt as it is collected. If the wound be apt to heal up too ſoon, which will be known by the ſymptoms of oppreſſion being renewed, it will be proper to keep the paſſage open by tents, or to introduce a bougie or ſilver canula a few hours occaſionally, till the ſource of the matter be dried up; which, however, ſeldom happens for a conſiderable time, and frequently never. By attending to this circumſtance, the patient may enjoy good health; whereas, by the neglect of it, a repetition of the firſt operation would ſoon be neceſſary.

CHAP. XXII. OF PARACENTESIS OF THE ABDOMEN.

THIS operation is an opening made into the abdomen, in order to empty any quantity of extravaſated water collected in that ſpecies of dropſy called the *aſcites*.

Symptoms.] A fluid in the cavity of the abdomen is diſcovered by the ſwelling which it produces; by a ſenſe of tightneſs in the part affected; by laborious and difficult breathing, eſpecially when in the horizontal poſture; but particularly by a ſenſe of fluctuation being communicated to the fingers placed on one ſide of the abdomen, while the ſwelling is forcibly ſtruck on the oppoſite ſide. There is beſides much thirſt, a dry ſkin, ſcantineſs of urine, &c. Whatever may be the influence of diuretics and other evacuations in the cure of general dropſical affections, they are rarely ſerviceable in local diſeaſes of this kind, and even the operation of tapping ſeldom cures the diſeaſe; but it commonly gives the patient eaſe for the preſent and is attended with very little pain.

Operation of the paracenteſis.—Upon the ſuppoſition that nothing forbids the extraction of the water, the manner of operating is this: having placed the patient in an horizontal ſituation, as beſt ſuited to prevent fainting, and to allow the water to run freely off, the part to be perforated ought to be marked with ink; and the moſt approved part for the operation ſeems to be at a point lying at nearly an equal diſtance between the umbilicus and the centre of the ſpine of the os ilium, this being moſt out of the way of any of the viſcera, and ſufficiently depending to allow the water to eſcape; and as the ſpleen is leſs frequently enlarged than the liver, the left ſide is generally preferred. Various means have been uſed for applying an equal preſſure in this operation. Some apply preſſure by the hands of aſſiſtants; others uſe a broad piece of flannel, or other kinds of cloth, ſlit a certain way from each end; then the ends are drawn by aſſiſtants till ſufficient preſſure is made. Broad belts are uſed by ſome practitioners; but one of the beſt contrivances for this purpoſe is the bandage invented by the late Dr. Monro. Till of late years, a puncture was firſt made with a lancet, then a trocar of the common round form with a triangular point was conſtantly uſed; but the entrance of this inſtrument being always attended with difficulty and pain, a flat trocar is now employed; and that invented by Mr. Andrée (Plate II. fig. 56) ſeems the beſt which has yet appeared. The bandage being now applied and drawn a little tight, the part to be punctured is to project a little over the edge of the bed. The operator fixes the head of the trocar in the palm; while the fore-finger directs the point of the inſtrument. He is then to puſh it forwards till he is ſatisfied, by the want of reſiſtance, that the end of the canula has reached the cavity of the abdomen. The perforator is now to be withdrawn, and the water allowed to flow as long as any of it can be taken off, the bandage being from time to time pulled to favour the diſcharge. But if the patient become faint, a ſtop for a few minutes ſhould be put to the diſcharge every now and then, by placing the point of the finger upon the mouth of the canula. If any of the viſcera happen to ſtop the flow of the water before the ſwelling is much diminiſhed, a blunt probe is to be introduced, but bent at the end, leſt it ſlip into the cavity of the abdomen. When the ſerum is thick and gelatinous, it may ſometimes be neceſſary to introduce a larger trocar than the one firſt employed. When the water does not flow, becauſe it is collected into ciſts, the canula is to be withdrawn, and the wound covered with a pledget of ſimple ointment. The operation may then be renewed immediately, or on the following day, upon the oppoſite ſide of the abdomen, or in the moſt depending part of the tumor, in whatever part of the abdomen it may be placed.

During the operation it is neceſſary to keep up a preſſure on the abdomen, otherwiſe the patient will be apt to fall into faintings from the weight on the great veſſels of the abdomen being taken off, and the ſinking of the diaphragm ſucceeding, in conſequence of which more blood flows into the inferior veſſels than uſual, the ſuperior ones are left too empty, and thus the regular progreſs of the circulation is interrupted. To obviate this, the preſſure muſt not only be made during the operation, but be afterwards continued. As to the dreſſing, it has been already mentioned, that the wound may be covered with a pledget of ſimple ointment; but between the ſkin and the roller ſome recommend a piece of flannel dipped in brandy or ſpirit of wine to be applied. The bandaging in this manner may even have ſome effect in preventing a return of the diſorder. When the water again collects, the operation ſhould be repeated whenever the ſwelling has acquired a conſiderable ſize: and though this operation does not always effect an abſolute cure, yet it ſometimes preſerves life a great many years, and even a comfortable one, eſpecially if the waters have been long collected.

After the operation, practitioners adviſe the abdomen to be frequently rubbed with aſtringent ſpirituous applications. This cannot be done for the firſt two days after the operation, as it would then be improper to remove the bandages; but after that time, they may be removed daily, for about a quarter of an hour; and camphorated ſpirit of wine, or other applications which may have a ſimilar effect, may be applied with ſtrong friction over the abdomen, the body being kept, during this period, in the horizontal ſituation, and the bandage applied immediately after the friction is finiſhed.

Tympanites.—Sometimes, inſtead of water, we find air contained in the abdomen; and the inflation is of two kinds: firſt, that in which the air is contained in the inteſtines; in which caſe the patient has frequent exploſions of wind, with a ſwelling of the belly frequently unequal. Secondly, where the air is collected in the cavity of the abdomen; and here the ſwelling is more equal, without any conſiderable emiſſion of air. In both varieties of the diſeaſe the ſwelling is more tenſe than where water is contained, and the belly ſounds when ſtruck, and affords to the touch and preſſure nearly the ſame ſenſation as it received from a bladder filled with air. Of theſe two diſorders the former is by much the moſt common. Many extenſive practitioners have never met with an inſtance of true abdominal tympanites. A few well-authenticated caſes, however, have occurred, where the air was collected between the containing and contained parts of the abdomen. In ſome of them the air was found to have eſcaped by a ſmall hole in the inteſtines, from which it has been ſuppoſed that the other caſes were of the ſame nature. When the ſymptoms become urgent, there is as much neceſſity for diſcharging the air as for drawing off the water in caſes of dropſy. The preſſure and perforation are to be made in the ſame manner as directed for aſcites, with this difference only, that a trocar of the very ſmalleſt ſize ought to be uſed; for by it the air can be as eaſily diſcharged, and the wound will heal more readily than when a large opening is made. After the air has been extracted, the treatment ought to be nearly the ſame as that recommended in caſes of aſcites.

We cannot conclude the preſent chapter, without calling the reader's attention to a paper *on the Paracenteſis of the Abdomen*, publiſhed by Dr. James Sims, in the Memoirs of the Medical Society of London.

"The objections to the common mode of performing the paracenteſis," ſays the doctor, "are numerous. A worſe perforating inſtrument than the trochar can ſcarcely be contrived; for which reaſon conſiderable force is obliged to be uſed in driving it through the integuments, which being uſually done by a ſtroke, it goes with a jerk into the cavity. In this mode no one can be certain how far it will penetrate; and I have known it, even in ſkilful hands, penetrate into the ſubſtance of the ſpleen and other viſcera. To avoid this danger, I remember a celebrated anatomiſt recommending the perforation to be made, prior to the uſe of the trochar, with a lancet through the ſkin, which gives the principal reſiſtance, thus preferring a complicated but ſafer operation, to a more ſimple but dangerous one.

"The uſe of the canula afterwards is perhaps not leſs objectionable; by its means more water is drawn off than the contraction of the integuments can compenſate; therefore formerly many perſons died under the operation. As this event was ſuppoſed, not unjuſtly, to take place from the ſudden removal of the preſſure upon the adjacent veſſels, it has been propoſed, and almoſt univerſally adopted, to make a preſſure on the abdomen, by the hand, or by means of rollers, bandages, or laced waiſtcoats. How diſſimilar ſuch preſſure to the natural, and how deficient in equality and uniformity! It is true it abated the danger of inſtantaneous ſyncope and death; but that it took away the more ſlow effects of the inanition may be doubted. What adds to the danger alſo is the common preference given to a large canula, on account of its being leſs liable to obſtruction. Whenſoever the canula is obſtructed, which moſtly happens from the application of the inteſtines to its orifice, a probe is introduced for their removal, without any thought of the probable, though remote conſequences, of the application, and it may be ſaid irritation of ſuch unuſual extraneous matter to their peritoneal coat. And even where no probe has been introduced, the point of the canula muſt come in contact with that ſurface, when the water is nearly evacuated. About the ſame time likewiſe cold air is perhaps moſtly admitted into the cavity, which is thought by many to be a very pernicious application.

"The place where the operation is performed, which is halfway between the umbilicus and the upper anterior ſpinal proceſs of the ileum, is not unexceptionable, the thickneſs of the integuments preventing an accurate perception of any enlarged or adhering viſcus underneath. But the courſe of the epigaſtric artery is ſtill a greater objection. It may be made a queſtion whether there be not ſo great a variety in its courſe in healthy bodies as to prevent even a good anatomiſt from being able to point out its exact ſituation in any one body before diſſection: but, admitting that he could do ſo in a healthy body, the caſe is different in the aſcites, where from diſtenſion the ſituation of parts is ſo much altered as not improbably to bring the artery to very nearly the place where the operation is directed to be performed. That this is ſometimes the caſe I know from having loſt a very dear relation by that artery having been wounded by the trochar, and from my knowing ſome other ſimilar events, I have reaſon to think that misfortune not unfrequent, even in very ſkilful hands.

"From which of the former cauſes the almoſt conſtant bad ſucceſs of the operation is derived I ſhall not pretend to determine; but have found, that in vaſtly the majority of caſes a fever ariſes after a few days, with thoſe ſymptoms which may be ſuppoſed to point out peritoneal inflammation, and which cuts off the patient about, or ſoon after, the end of the ſecond week. Were the proportion of the deaths to be accurately ſtated, it may be doubted whether any practitioner would chooſe to perform the operation, and alſo whether more would not recover if left entirely to themſelves. The common people at leaſt are ſo convinced of this, that it is with great difficulty they are brought to ſubmit to it. But unfortunately in medical records the few ſucceſsful caſes are detailed at full length, whilſt all the others are conſigned to total oblivion.

" Alarmed at the frequent miſcarriages of the operation which I beheld, and greatly ſhocked at the loſs of the relation I have juſt mentioned, I ventured, upwards of twenty years ago, when practiſing in the country, to recommend an entire change in the operation, by uſing the lancet alone at the umbilicus.

" The firſt hint to this practice I took from a caſe of Aſcites, which luckily occurred whilſt the grief for the before-mentioned fatal hæmorrhage was yet ſtrong on my mind. In this caſe the old cicatrix at the umbilicus opened, and, permitting a free paſſage to the water from within, on the leaſt effort to cough the fluctuation was felt under the ſkin, which being ſlightly punctured with a lancet, the whole water collected in the abdomen was evacuated. Upon conſidering this caſe maturely, I reſolved to carry the practice one ſtep further, and to have the puncture made through the peritonæum in the next caſes that might occur, ſhould there be no ſimilar opening at the ſpot; and, of ſeven caſes wherein this advice was then followed, four recovered perfect health.

" On my firſt coming to this city I propoſed the method to ſeveral practitioners, but without effect; and I did not find myſelf ſo well eſtabliſhed in the public confidence as to authoriſe my inſiſting on the operation. I have lately, however, had it performed in three caſes, by Mr. Norris, an ingenious ſurgeon of this place. In the firſt it proved completely ſucceſsful. The ſecond was as bad a caſe as I ever ſaw: a very ſmall delicate lady, who had above forty quarts of water in her abdomen; the integuments were grown ſo thin as to threaten burſting; ſhe had not been out of bed for many months; her pulſe was extremely quick, and ſcarcely to be felt; and her ſtomach would not retain any aliment.—It is needleſs to ſay that this caſe terminated fatally. The third was the caſe of a woman who had been repeatedly tapped before, and has been alſo ſeveral times ſince.

" The operation which I allude to is very ſimple, being nothing more than thruſting in a common lancet at the umbilicus, until the water iſſues. The orifice ſhould not be large, nor ſhould the water be forcibly preſſed out, but allowed to come away juſt as the contraction of the integuments occaſions. Some water even moſtly remains in the abdomen; but this is afterwards abſorbed in thoſe caſes that terminate favourably. The evacuation is gentle, and continues a day or two, ſometimes ſix or eight. The part where the orifice is made being tendinous, does not cloſe while there is any preſſing force exerted by the muſcles; and there is ſcarcely a drop of blood loſt.

"The preſſure occaſioned by the water upon the contents of the abdomen, and even in ſome meaſure of the thorax, is not ſuddenly taken off; ſo that there is no occaſion for rollers, or a laced waiſtcoat. If we ſuppoſe with ſome, that the mere injury done to the membrane lining a cavity conſtitutes the danger, we may as readily ſuppoſe it to be avoided by this mode, as the part injured is only the cicatrix left after the falling off of the navel-ſtring in the fœtus, and therefore very different from any other part of the peritonæum.

"Having given this conciſe hiſtory of what I have ſeen of this operation, I ſubmit it to the conſideration of the medical faculty, hoping that it will appear not unworthy of a further trial. At the ſame time I muſt freely declare, that I know not one objection to this mode that does not more forcibly apply to the common one; whereas in elegance, ſimplicity, eaſe, freedom from hæmorrhage and pain, and in a number of other reſpects, it ſeems vaſtly preferable.

"It is to be noticed, that this operation is totally different from the perforation at the umbilicus recommended by ſome early writers, but ſince laid aſide, in which a canula was uſed: the objections, therefore, to the latter, are not applicable to this operation."

CHAP. XXIII. Of HERNIÆ.

Sect. I. *Of* Herniæ *in general.*

The name of *hernia* might with propriety be applied to every ſwelling occaſioned by the diſlodgement of parts from thoſe boundaries within which, in a ſtate of health, they are contained; but the general acceptation of the term implies a tumor produced by the protruſion of ſome part or parts from the cavity of the abdomen.

Situation, &c.] The parts in which herniæ uſually appear are the groin, ſcrotum, labia pudendi, the upper and fore part of the thigh, the umbilicus, and different points between the interſtices of the abdominal muſcles. If the ſituation of ſuch tumors be various, the viſcera which produce them are ſtill more ſo; inſtances having occurred of the ſtomach, uterus, liver, ſpleen, and bladder, being found to form their contents. But a part of the inteſtinal canal, or a portion of the omentum, are from experience known to be the moſt frequent cauſe of their formation.

Diſtinctions.] From theſe circumſtances of ſituation and contents, all the different appellations are derived by which herniæ are diſtinguiſhed. Thus they are termed *inguinal*, *ſcrotal*, *femoral*, *umbilical* and *ventral;* from their appearing in the groin, ſcrotum, thigh, navel, or belly. When the tumor is confined to the groin, the hernia is ſaid to be incomplete, and is termed *bubonocele;* but when the ſwelling reaches down to the bottom of the ſcrotum, the rupture is then ſuppoſed to be complete, and the diſeaſe obtains the name of *ſcrotal rupture.*

Of theſe diſorders the inguinal hernia is by much the moſt frequent; next to that is the femoral. The umbilical is ſeldom obſerved in men, or even in women who have not borne children.

Cauſes.] The cauſes which tend to the production of hernia in its more uſual form are theſe:

I. The containing parts of the abdomen we know to be elaſtic and compreſſible; whatever, therefore, tends to produce a diminution of capacity in the cavity of the abdomen, muſt occaſion a proportional degree of riſk of ſome of the contained parts being puſhed from their natural ſituations. Violent coughing, crying, laughter, or great bodily exertion, are attended with more or leſs contraction of the abdominal muſcles, and particularly of the diaphragm; and as the contraction of theſe muſcles muſt always diminiſh the abdominal cavity, theſe cauſes therefore are frequently found to be productive of herniæ.

II. Falls, in conſequence of the derangement they produce in the abdominal viſcera, from the ſudden and violent ſhock with which they are often attended, are not unfrequently the immediate cauſes of herniæ.

III. Perſons of a preternatural laxity of frame are very liable to herniæ. The containing parts of the abdomen, from the want of a ſufficient tone and firmneſs, are unable in ſuch people to reſiſt on all occaſions the weight of the different viſcera; and they are therefore more particularly expoſed to diſorders of this kind on the ſlighteſt application of any of the cauſes already mentioned.

IV. Sprains are apt to induce a laxity of the part injured; and have therefore a ſimilar influence in inducing herniæ with general laxity.

V. It has been obſerved that the people of thoſe countries where oil is much uſed as an article of diet are particularly liable to herniæ.

In whatever parts the parietes of the abdomen happen to be weakeſt, theſe various cauſes will moſt readily operate in producing herniæ; and accordingly we find, that deſcents of the bowels uſually occur only in ſuch parts.

In whatever ſituation a protruſion of any portion of the inteſtines occurs, except in the caſe of the hernia congenita, as all the viſcera are contained within the peritonæum, a portion of that membrane it is evident muſt be carried down together with the parts protruded; and in every ſuch inſtance, it is this portion of the peritonæum which goes down along with the gut, that is termed the *hernial ſac*. The ſize of this ſac is various in different ſubjects, and in different ſtages of the ſame diſorder. On the firſt appearance of the diſeaſe, it is commonly of no very conſiderable ſize, as ſuch ſwellings ſeldom acquire any great bulk at once: but by repeated deſcents of the bowels, it comes to be puſhed lower and lower, till in ſome inſtances its bulk becomes very conſiderable indeed; and when in this advanced period of the diſorder the ſac happens to be laid open, it is found to contain either large quantities of omentum or inteſtine, and frequently large portions of each. As the peritonæum has this property in common with many other parts of the body, of thickening according to the degree of any gradual extenſion applied to it, ſo in many inſtances the thickneſs and firmneſs of the hernial ſac are really aſtoniſhing.

Cauſe of bad ſymptoms.] All the bad ſymptoms which are found to occur in herniæ, proceed, as may be readily ſuppoſed, either from obſtruction to the paſſage of the fæces when the inteſtinal canal forms the tumor, or from a ſtoppage of circulation occaſioned by ſtricture on the prolapſed parts: ſo that the attending ſymptoms, it is evident, will be always more or leſs hazardous, according to the nature of the parts ſo protruded.

Thus, when omentum alone forms the ſubſtance of hernial ſwellings, as that organ does not appear to be ſo immediately neceſſary for life as many of the other viſcera, ſuch tumors accordingly are not ſo frequently productive of bad conſequences, at leaſt they are ſeldom in any degree ſo hazardous as when a part of the alimentary canal is either protruded by itſelf or along with omentum.

Although this, however, is in general the caſe, yet it does ſometimes happen, that even an omental rupture is productive of no ſmall degree of danger. When a ſtricture ſo complete upon it occurs as to occaſion a ſtoppage of circulation in the protruded part, mortification with all its bad conſequences muſt be the certain event: and beſides, the connection between the omentum, ſtomach, and other viſcera, is ſuch, that a ſudden deſcent of any conſiderable portion of the former ſometimes brings on vomiting, hickup, and other troubleſome ſymptoms; and laſtly, although a rupture containing omentum only might not of itſelf produce any thing bad; yet as the paſſage through which the omentum has ſlipped muſt of neceſſity continue open ſo long as that viſcus remains protruded, and as that circumſtance alone muſt, ſo long as it continues, render it more eaſy for a portion of gut likewiſe to get down, this of itſelf is a ſufficient reaſon for entitling even this ſpecies of hernia to the ſerious attention of practitioners.

But whatever the contents of ſuch ſwellings may be, as their remaining in ſome inſtances for a conſiderable length of time without being productive of any bad ſymptoms, muſt proceed entirely from the circulation continuing to go freely on, notwithſtanding the derangement of parts; ſo, whenever a ſtricture occurs on the protruded viſcera, ſufficient to produce either a ſtoppage of the circulation, or of the fæcal contents of the alimentary canal, when a portion of gut forms the diſeaſe, the following in general are the ſymptoms which accrue.

An elaſtic colourleſs ſwelling is obſerved at the part affected; a ſlight pain is felt not only in the ſwelling itſelf, but, if part of the alimentary canal is down, an univerſal uneaſineſs is perceived over the whole abdomen; and this pain is always rendered worſe by coughing, ſneezing, or any violent exertion. The patient complains of nauſea; frequent retching; can get no diſcharge by ſtool; becomes hot and reſtleſs; and the pulſe is commonly found quick and hard. When the ſwelling is formed entirely by a portion of gut, if no fæces be contained in it, it has a ſmooth, equal ſurface; and is eaſily compreſſible, but inſtantly returns to its former ſize on the preſſure being removed: but in gut-ruptures of long ſtanding, where hard fæces have collected in the protruded bowels, conſiderable inequalities are detected. When again the tumor is compoſed both of gut and omentum, its appearance is always unequal, it feels ſoft and ſomewhat like dough, and of courſe is not ſo elaſtic as when part of the inteſtinal tube only is down; for although, like the other, it is compreſſible, it does not ſo readily regain its former dimenſions on the preſſure being taken off.

It will be readily ſuppoſed, that the ſymptoms we have deſcribed never can happen from the preſence of omentum *only*; for although ſtricture produced on a portion of omentum, even when no part of the inteſtinal tube is down, does now and then occaſion a good deal of diſtreſs, ſuch as pain in the part, ſickneſs, vomiting, and twitching pains through the whole belly; yet no obſtruction of the gut ever occurs from this, and of courſe none of the ſymptoms ever prove ſo alarming as when any part of a gut is affected.

Signs of mortification.] If the ſymptoms deſcribed as being produced by a ſtrangulated gut, are not obviated by a removal of the ſtricture which produced them, the nauſea and retching terminate in frequent vomitings, firſt of a bilious, and afterwards of a more fetid matter; the belly becomes tenſe; the pain turns more violent; a diſtreſſing convulſive hickup comes on; the fever, which before was not apparently of much conſequence, now becomes very formidable; and a total want of reſt, with a very diſagreeable ſtate of anxiety, continues through the whole courſe of the complaint.—Theſe ſymptoms having gone on with violence for ſome time, the patient is at laſt commonly relieved on a ſudden from all manner of pain; and then he flatters himſelf that all danger is over. But inſtead of that, the pulſe, from having been hard and frequent, becomes languid and interrupted; cold ſweat breaks out over the whole body, but eſpecially on the extremities; the eyes acquire a kind of languor; the tenſeneſs of the abdomen ſubſides, and the ſwelling of the part affected diſappears; the teguments covering the parts, which before were either of a natural appearance, or had ſomewhat of a reddiſh inflamed caſt, now acquire a livid hue, and a windy crepitous feel is diſtinguiſhable all over the courſe of the ſwelling. If the protruded parts have not of themſelves gone entirely up, their return is now in general eaſily effected by a ſmall degree of preſſure, and the patient then diſcharges freely by ſtool; but the cold ſweats increaſing, the hickup turns more violent, and death itſelf is at laſt uſhered in by its uſual forerunners, ſubultus tendinum, and other convulſive twitchings.

Theſe are the ordinary ſymptoms of what is termed a *ſtrangulated* or *incarcerated hernia:* that is, when the parts protruded become ſo affected by ſtricture as to produce pain; and do not either return to their natural ſituations on the patient's getting into a horizontal poſture, or cannot even be immediately replaced by the hands of a practitioner.

Cure.] In whatever ſituation a ſtrangulated hernia occurs, the only rational method of cure, it is evident, muſt conſiſt in the removal of that ſtricture which prevents the return of the protruded parts. It is that ſtricture which ought to be conſidered as the cauſe of all the miſchief; and unleſs it be removed, nothing effectual can be done for the relief of the patient.

Various methods have been attempted by practitioners for the removal of ſtricture in theſe diſorders; all of which may be comprehended under two general heads.

I. Such as effect a reduction of the protruded parts, without the interpoſition of inciſion or any chirurgical operation properly ſo called; and,

II. A diviſion of the parts producing the ſtricture, ſo as to admit of a replacement of the deranged viſcera, conſtituting what is termed the *operation for the hernia.*

The remedies to be employed for accompliſhing the firſt of theſe are, a proper poſture of the patient, with the manual aſſiſtance of a practitioner; blood-letting, ſtimulating clyſters, opiates, the warm bath, and proper applications to the tumor itſelf.—If theſe fail, there is then no other means of cure left but the operation of dividing the integuments, and replacing the viſcera.

As ſoon as the aſſiſtance of a practitioner is deſired for the removal of ſymptoms in caſes of hernia, the firſt circumſtance requiring his attention is the placing of his patient in ſuch a poſture as will moſt probably favour the return of the protruded parts. Placing the patient's feet over the ſhoulders of another perſon, while his body is allowed to hang downwards, and cauſing him to be a good deal jolted about, has on ſome occaſions anſwered when other means have failed.

The ſurgeon ſhould at the ſame time endeavour to aſſiſt the return of the bowels, by means of gentle preſſure with his hands and fingers. In the inguinal or ſcrotal hernia, this preſſure ſhould be made obliquely upwards and outwards to correſpond with the opening in the external oblique muſcle; in the femoral hernia it ought to be made directly upwards; in the umbilical and ventral hernia directly backwards.—The ſwelling ſhould be graſped with one hand at the bottom, while with the fingers of the other hand an attempt is made to puſh gently the contents of the tumor into their place, always obſerving that the parts laſt protruded be firſt reduced. This operation is by authors termed the *taxis*.

When the means now mentioned have failed, no remedy affords more relief than blood letting. The quantity to be drawn ought chiefly to be determined by the ſtrength of the patient. There is ſcarcely any diſeaſe, however, where ſuch large quantities of blood can with propriety be taken from weak people. Blooding till the patient is in a ſtate of deliquium animi, is frequently known to produce a more effectual relaxation of the muſcles than can be done by any other means. On that account it is ſometimes adviſed in caſes of hernia, and the practice is now and then attended with advantage.

As an obſtinate coſtiveneſs is commonly one of the moſt alarming ſymptoms of hernia, it has been a common practice to exhibit a variety of ſtimulating purgatives both by the mouth and anus; but they are very ſeldom of much ſervice, and in that caſe almoſt univerſally do injury, by increaſing not only the ſickneſs at ſtomach, but the tenſion and pain of the tumor. When they are to be employed, they ought to be thrown up by the anus. For this purpoſe aloes and other ſtimulating ſubſtances, but particularly tobacco-ſmoke, are employed; and although this laſt remedy, which is to be thrown in by double bellows, &c. does not always act as a purgative, it may be uſefully employed as an anodyne. Where an evacuation by ſtool is wanted, it may in general be readily procured by the injection of warm water, in which a little Caſtile ſoap is diſſolved, in the proportion of a drachm or a drachm and a half of the latter to a pound of the former. Warm bathing is another remedy greatly extolled, either by general immerſion or local application, by means of warm water put into ox-bladders covered with flannel, and laid acroſs the abdomen.

To diminiſh the ſize of the tumor, remedies of an oppoſite quality from theſe have been uſed; and though by ſome this practice has been conſidered as hazardous, yet by others, particularly by the late Dr. Monro and Mr. Benjamin Bell, more advantage has been found from cooling applications than from thoſe of a different nature. Snow, ice, or cloths dipped in a recent ſolution of ſal ammoniac in water and vinegar, or cold ſaturnine applications, or cold water and vinegar, have been employed with advantage. If, notwithſtanding theſe remedies, the diſeaſe becomes worſe, and no probability remains of ſucceſs, the diviſion of the parts producing the ſtricture can alone ſave the life of the patient.

To determine the *exact time at which to proceed to an operation*, has been conſidered as one of the niceſt points in ſurgery. In general, when every attempt has failed, and no repetition of the former remedies is likely to ſucceed, the ſurgeon ought certainly to proceed to the operation. A few hours, even when aſſiſtance has been early applied, is perhaps all the time which ought ever to be conſumed in trials of this nature. But however neceſſary this operation may be when a patient's life is in danger, as it is always attended with ſome degree of hazard, it ought never to be practiſed where ſymptoms of ſtrangulation do not exiſt.

In that kind of hernia called *chronic*, the circulation in the part forming the hernia, as well as the periſtaltic motion of ſuch parts of the alimentary canal as have been protruded, go freely and regularly on. There are many inſtances of large herniæ falling down even to the bottom of the ſcrotum, and continuing there for many years, without producing any interruption to the uſual diſcharge by ſtool. All that can be done here is, to prevent any accumulation of fæces in the inteſtine, by preſcribing a proper diet, and the occaſional uſe of gentle laxatives; and obviating any inconvenience which might ariſe from the weight of the tumor, by the application of a proper truſs or ſuſpenſory bandage; to warn them of the riſk to which they are conſtantly liable, and to caution them againſt violent exerciſe, particularly leaping, and every ſudden exertion. The truſs ought to be fitted exactly to the part for which it is intended, for without the utmoſt nicety in this reſpect, it muſt always do more harm than good; for the ſole purpoſe of a bandage, in caſes of hernia, is to prevent effectually the falling down of ſuch parts as have been newly replaced. If therefore the pad or bolſter of the bandage does not bear properly againſt the opening upon which it is placed, a portion of gut may ſlip out, and be materially injured by the preſſure of the pad. Fig. 58 repreſents a truſs for an inguinal or femoral hernia of one ſide, fig. 59 a truſs for the ſame diſeaſe in both ſides, and fig. 60 a truſs for an umbilical hernia.

Operation for the hernia.—The circumſtances to be attended to in performing the operation for hernia in general are theſe. A table of convenient ſize and height being placed in a proper light, the patient muſt be ſo laid on it as to relax the diſeaſed parts as much as poſſible, and then ſecured by proper aſſiſtance. To leſſen the contents of the abdomen as much as poſſible, the bladder ought to be emptied previous to the operation. An inciſion is to be made with a common round-edged ſcalpel through the ſkin and part of the cellular ſubſtance, long enough to allow the ſtricture to be fully expoſed. The reſt of the cellular ſubſtance is then to be divided with the greateſt attention. That part of the muſcle forming the ſtricture or ring muſt next be laid diſtinctly in view. A ſmall portion of the protruding ſac muſt alſo be expoſed; after which the directory (fig. 57.) is to be paſſed between the ring and the ſac. A ſtraight probe-pointed ſcalpel is now to be introduced into the groove of the directory, and by it the ring is to be dilated till the point of the finger can be introduced. The finger is here conſidered as the ſafeſt director; for it being inſinuated into the aperture in the tendon immediately above the protruded parts, the point of the knife is eaſily introduced upon it; and by keeping the end of the finger always a little before the knife, the opening may be enlarged to any neceſſary extent without riſk of wounding any of the contiguous parts.

By the eaſe with which the finger is introduced, the operator will be enabled to judge when the ring is ſufficiently dilated; and if the ſtrangulation was entirely in the ring, it will now be evident that every obſtacle to the reduction muſt be removed, and of conſequence that the prolapſed parts may be returned with little difficulty. If the patient be young, or if the diſeaſe has continued a conſiderable time, ſuch a degree of inflammation frequently enſues in the neck of the ſac as to produce thickening and ſtraitneſs; ſo that, after the ſac and its contents have been entirely freed from the ſtricture of the ring, the inteſtines cannot be reduced. We judge this to be the caſe when, after the ſtricture of the ring has been removed, the parts prolapſed do not expand into their natural ſize, and further, when they make reſiſtance when we attempt to return them. In this caſe, the neck of the ſac muſt be opened with the utmoſt caution, to avoid wounding the parts within it.

If the hernial ſac, under the ſtraitened part of its neck, be thin and tranſparent, and there is little or no reaſon to ſuſpect an adheſion of the bowels to the ſac, the beſt method, as Dr. Monro, in his publication on the Burſæ Mucoſæ, obſerves, will be to make a ſmall hole in the ſac below the ſtricture, and then to introduce a ſmall furrowed probe, and to cut cautiouſly upon it. But if the ſac be thick and dark coloured, and there is likewiſe a ſuſpicion that the bowels may adhere to it, the eaſieſt and ſafeſt manner will be to make the hole in the peritoneum above the ſtricture; then to introduce a common probe, bent near its point into a ſemicircle, with its point directed downwards through the ſtricture into the ſac; and upon the point of it to make, with great caution, another ſmall hole; after which we may either cut upon the probe, or introduce a furrowed probe, and divide the neck of the ſac.

After this, the bowels are to be returned by preſſure upon the ſac, without opening it further; and the ſides of the wound in the ſkin are to be brought together, and kept ſo by means of ſlips of adheſive plaſter, though ſtitches made at the diſtance of a finger breadth from each other will exclude the air, and prevent the return of the bowels more effectually. Over theſe are to be laid ſeveral folds of charpee, and the whole is to be ſecured by a bandage adapted to the nature of the part.

Subſequent treatment.—The patient, upon being carried to bed, ſhould be ſo placed as to have the part upon which the operation was performed higher than the reſt of his body, or at leaſt as high as the ſituation of the part operated upon will allow, in order to prevent a return of the diſeaſe. After the operation, opiates are particularly uſeful, and ought to be repeated as circumſtances may require. It is likewiſe neceſſary that the patient be kept cool. In plethoric habits, blood-letting is proper, together with a rigid attention to low diet. A frequent uſe of clyſters and gentle laxatives, to keep the belly moderately open, ought not to be neglected. When the conſtitution has been previouſly much reduced, inſtead of blood-letting and a low diet, a nouriſhing regimen is neceſſary. The dreſſings ought not to be removed till the third or fourth day after the operation, when the ſides of the wound will be found almoſt adhering together; and if attention be paid to the ſubſequent treatment, the ſore will be generally healed in two or three weeks. As ſoon as the wound is firmly cicatrized, a truſs ought to be properly fitted to the part, and ſhould never, on any future period of life, be laid aſide.

When the hernia is of *long ſtanding*, and when there is reaſon to think *adheſions* have taken place between the ſac and bowels, or that *mortification* has already begun, or that ſome filaments run acroſs the ſac and prevent the reduction, or that there is water in the ſac, or that the gut is in danger of being entangled from a part of the omentum being down, a different method of operating becomes neceſſary.

The patient is to be placed as already directed. The operator is to graſp the tumor with one hand, ſo as to make the ſkin tenſe on the fore part of it, while with the ſcalpel in the other he divides the ſkin from one end of the tumor to the other. The cellular ſubſtance is by gentle ſtrokes to be divided, till not only the ring, but the whole length of the ſac, is laid bare. An opening is now, in the moſt cautious manner, to be made into the ſac by ſlight ſcratches, to avoid hurting any of its contents.

In making this perforation, which is conſidered as the niceſt part of the operation, conſiderable aſſiſtance is obtained from the uſe of the ſmall directory, upon the point of which the fibres of the ſac are to be ſucceſſively raiſed and divided till an opening is made. The opening is to be enlarged till it admit the fore-finger of the left hand, which ſerves as a directory for conducting the ſtraight probe-pointed ſcalpel with which the ſac is to be divided through its whole length.

The ſac being laid open, the parts contained in it ought to be examined with the niceſt attention, to diſcover whether they are all ſound or not; and if, upon an attentive inſpection, it is found that they are not evidently in a gangrenous ſtate, even although they ſeem conſiderably inflamed, they ſhould be immediately returned into the abdomen. When adheſions take place between different parts of the protruded gut, the greateſt caution is neceſſary in ſeparating them. When one part of a gut adheres ſo firmly to another as not to be ſeparated but with difficulty, it is much better to return the whole, even in that ſtate, into the abdomen, than to run the riſk of hurting the inteſtine materially by uſing much force. When adheſions occur between the hernial ſac and the gut, or between the gut and omentum, if the filaments producing the connection cannot be otherwiſe removed, as there is no great hazard in wounding the omentum, and ſtill leſs in hurting the ſac, a very ſmall portion of theſe may be diſſected, and returned with the gut into the abdomen. When the bowels cannot be reduced with eaſe, the ring is to be dilated by the blunt pointed ſcalpel in the manner already directed. After returning the contents of the ſac into the cavity of the abdomen, it has been propoſed by ſome authors to paſs a ligature round the neck of the ſac, with a view of procuring a reunion of its ſides, ſo as to prevent a future deſcent of the bowels; and various other methods, even actual and potential cauteries, have been propoſed: but as none of them yet attempted have been found ſufficiently to anſwer the purpoſe, the only thing that can be recommended is a well-made truſs.

When the bowels are actually *in a ſtate of gangrene*, as the returning of ſuch mortified parts might be attended with the very worſt conſequences, a great degree of caution is neceſſary. When the omentum is found in a mortified ſtate, as the exciſion of a portion of this ſubſtance is not attended with much riſk, it is the common practice to cut away the diſeaſed parts; and to obviate any inconvenience which might enſue from the hemorrhagy, we are adviſed to make a ligature on the ſound parts previous to the removal of thoſe which are mortified; whilſt the ends of the ligature being left hanging out of the wound, the ſurgeon has it in his power to remove them when circumſtances appear to render it proper. Theſe ligatures on the omentum, however, are frequently productive of bad conſequences. No hemorrhagy of any importance ever occurs from a diviſion of this membrane, even in a ſound unmortified ſtate; ſuch parts as have become gangrenous may, therefore, be freely cut off, and the remaining ſound parts be afterwards, without the intervention of ligatures, ſafely introduced into the abdomen. If a veſſel of any ſize in the omentum has been divided, a ligature may be paſſed above the veſſel itſelf, and the ends left hanging out of the wound; the threads may be afterwards pulled away at pleaſure. When a rupture has been of long duration, it ſometimes happens, that from the preſſure made by the truſs, and other circumſtances, portions of the omentum are collected together into hard lumps. If theſe be ſmall, they may be returned into the abdomen without producing any inconvenience; but if from their bulk and hardneſs they are likely to do miſchief, they ought to be cut off. When part of the omentum is to be removed, it ought to be previouſly expanded and divided with ſciſſars, which will be more convenient than any other inſtrument. When again a ſmall portion of gut is found mortified, we are to endeavour, by means of a needle ligature, to connect the found part of the gut immediately above the mortified ſpot to the wound in the abdomen already made. By this means, when the mortified part ſeparates, or, perhaps, what is better, when it has been immediately cut off, the fæces are diſcharged by the wound; and there are different inſtances where, after ſuch a diſcharge has continued for ſome time, the wound has entirely healed.

But when the mortified portion of gut is of conſiderable extent, and includes the whole circumference of the inteſtines, all that can be done is to remove it, and to draw, by means of a ligature, the upper end of the gut towards the under, and afterwards connect them to the inner edges of the wound. This at leaſt affords a chance of the ends of the gut being brought to reunite; and if unfortunately that event ſhould not take place, a paſſage for the fæces will ſtill be ſecured. All ſuch mortified parts as are to be removed, ought to be cut off, and the remaining ſound inteſtine retained, before the opening in the ring can be dilated with ſafety, leſt the gangrenous portion ſlip in together with the ſound. The parts forming a hernia being all completely replaced, when the ſac in which they were contained is found thick, hard, and much inlarged, as in ſuch a ſtate no good ſuppuration can take place, and as its preſervation cannot be in any degree uſeful, ſuch parts of it as can be cut away with propriety, ought to be removed. All the lateral and fore parts of the ſac may be cut off with ſafety; but as it is commonly firmly connected with the ſpermatic veſſels behind, this part of it ought not to be touched.

Recent Improvements.] On this important branch of ſurgery various intereſting innovations or improvements have been ſuggeſted, and of theſe we proceed to ſelect ſuch as appear to deſerve particular notice.

The following ſtrictures on the uſual practice in ſtrangulated hernia, by Mr. Geoghegan, of Dublin, appear in the Medical and Phyſical Journal.

Having ſucceeded in reducing ſeveral inſtances of ſtrangulated hernia by the taxis, where the ſymptoms were ſo alarming as to point out the neceſſity of an immediate operation; the author is deſirous of exciting the attention of practitioners to this reſult; eſpecially as he appears convinced that the practice recommended by the lateſt writers of character on this ſubject, is productive of the moſt dangerous conſequences.

“ Mr. Bell,” ſays he, “ whoſe work is in the hands of every ſurgeon, lays it down as a maxim, that we ought always to proceed to the operation, if, after a few hours, two or three at the fartheſt, the remedies generally recommended do not prove effectual; and he does not think the operation, abſtractedly conſidered, attended with great danger. If we conſult the records of practice, ſurely we ſhall find a hoſt of evidence of the fallacy of this author's maxim; I am confident that the experience of every practitioner is in direct oppoſition to it; I have met with numberleſs inſtances, in which not only ſeveral hours, but days, have paſſed over before a reduction by the taxis could be effected in ſtrangulated hernia, attended with ſingultus, vomiting of feculent matter, &c. and afterward the protruded parts were reduced without operation. Similar caſes have occurred to every experienced practitioner with whom I have communicated on the ſubject; and as to the queſtion, whether the operation is to be held as dangerous, abſtractedly conſidered, I aver that it is imminently ſo. We know that the danger attendant on every operation of conſequence, turns as much upon the peculiarity of the patient's conſtitution, independent of the diſeaſe which it is intended to relieve, as on any other circumſtance; the moſt minute conſideration, therefore, ſhould be given to every means of relieving, before it is had recourſe to in any caſe. In the preſent inſtance, a ſubject in full health is ſuddenly laid proſtrate, attacked by a painful affection, which exceedingly deranges the entire ſyſtem, not habituated to it by gradual ſuffering; a deſideratum preparatory to an operation. Experience inſtructs us he can ill bear any violence; his inteſtines are to be expoſed to the air, a tendinous part to be wounded, and air may be admitted into the cavity of the abdomen; beſide the effects which a ſlow diſſection muſt produce on a ſubject juſt removed from a ſtate of health, ſurely nothing can be more obvious than that ſuch caſes are in principle exceedingly dangerous. The inſtructions which are given by Mr. Bell and Mr. Pott, as to the method of reducing by the taxis, appear to me not only imperfect but injudicious; they direct that the patient being properly placed, 'the ſurgeon is to graſp the inferior part of the hernia with one hand, and puſh upwards, whilſt he endeavours, with the fingers of the other, to puſh forward the parts at the ſuperior part of the tumor.' Let us for a moment conſider the ſtate of the parts; a portion of inteſtine lies without an aperture, through which it is too large to paſs; the queſtion then ariſes, what occaſions its bulk? Surely, the nature of the part, the touch, and all the circumſtances of the caſe, clearly evince it to be flatus, and ſometimes together with excrement, and an inflamed inteſtine, whoſe functions are ſo far deranged that it cannot act upon its natural contents, ſo as to move them in their ordinary courſe. The abdominal ring is in nowiſe concerned in the diſeaſe, only that as it is too ſmall to admit of the return of the inflamed and inflated parts, it unavoidably girts them; and nothing can be more abſurd than the idea of relaxing it, as from its ſtructure it muſt be paſſive. Let us ſuppoſe a ring fixed upon the neck of an inflated bladder, and that it is deſired that the bladder ſhould be paſſed through the ring, could any thing be more erroneous than to endeavour to puſh forward, and upwards, or any way, without removing the air which occaſioned the reſiſtance? The caſes are ſimilar; and nothing can be more obvious than that every effort ſhould be made to leſſen the bulk of the hernia, and none to puſh it through the ring; it will paſs in of itſelf after the air has been extricated. It is obſerved by thoſe authors, that a guggling noiſe is always heard on the paſſing up of the inteſtine, which they merely mention, but do not inſiſt upon, as the great and principal circumſtance to be attended to in forming a juſt opinion of the mode of treatment. The mode of practice which I purſue, founded on the preceding principle, is as follows: I expoſe the entire body to the cold, naked, open the windows, &c. and apply cloths to the part, wet every ten minutes, with a ſolution of muriated ammonia in vinegar and water; if ice can be procured, I prefer it. The patient generally complains much of the cold, and ſhivers, a deſirable circumſtance, as it induces ſuch a collapſe of the entire ſurface, as greatly to aſſiſt our intention of condenſing and expelling the air from its impriſonment, after about an hour ſpent in this way without touching the parts with the hands, or any effort by the taxis, as generally practiſed. Let the palms of the hands be applied to the ſides of the hernia, gently to preſs them towards each other, with a view to aſſiſt in propelling, not the inteſtine, but its contents, the air, &c. through the ring. In one inſtance I ſucceeded in this way on the eighth day, in another on the ſixth, after the ſtrangulation had ſet in in both, attended with vomiting of feculent matter, hiccup, &c. Many efforts had been made in the uſual way of endeavouring to force the inteſtine upwards and forwards, which, I am of opinion, always exaſperates the ſymptoms. In another caſe, the diſeaſe had exiſted about twelve hours; the volume protruded was immenſe, and the ſymptoms ran exceedingly high; the patient was of a remarkably robuſt habit. After taking off about 20 ounces of blood, and having applied the cold ſolution for ſome time, I endeavoured with my hands to aſſiſt in extricating the air, but was unſucceſsful. Being obliged to go away, I directed that he ſhould remain naked, expoſed to the cold, and to perſevere in the cold fomentation. On my return, after half an hour, his rupture had diſappeared. He told me that he heard a noiſe as if wind had ruſhed out of it, and that it went up of itſelf. Some practitioners apprehend danger from the application of cold to a part ſo much inflamed; but the ſcrotum and ſac are ſecure intermediums to moderate its operations on the inteſtine; and experience proves that danger is not to be dreaded. From theſe conſiderations, I preſume, it is obvious that the directions given by moſt authors are not calculated to produce the deſired effect, particularly the operation of puſhing the inflamed and inflated parts through the ring, which is, *prima facie*, impoſſible; that the practice of condenſing and extricating the air, has a rational foundation; and that the ſole attention of the ſurgeon ought to be directed to that end."

Mr. Geoghegan concludes by preſuming it to be underſtood that *bubonocele* is the diſeaſe on which he treats.

Some difference of opinion on the ſubject of the *degree of force* neceſſary to be employed, is evinced in the following remarks on *incarcerated herniæ*, publiſhed in the ſame work, by Mr. Ward, ſurgeon to the Mancheſter infirmary.

That gentleman recommends ſtrongly the *inverted poſition* whilſt the taxis is applied; by which it is meant, that the patient ſhould be held by the legs on the ſhoulder of an aſſiſtant; his body being allowed to hang down. Another aſſiſtant is then to ſupport his head and ſhoulders, and to incline them a little forwards, ſo as to relax the abdominal muſcles, and by that means favour the return of the inteſtine. The effects of this practice are evinced by Mr. Ward in the following caſes:

Case I. "May 25, 1795, Wm. Bellows was admitted into the Infirmary with a ſcrotal hernia, which had been in an incarcerated ſtate twelve hours. He complained of great pain, and had vomited frequently. He was bled copiouſly, and had a clyſter given, which produced a trifling evacuation only.

"While the warm bath was preparing, an aſſiſtant was directed to ſit upon the bed with his back towards the patient, and to graſp his legs (which were put upon his ſhoulders) juſt above the ancles, and to riſe up with him upon his back; another aſſiſtant was then directed to ſupport his head and ſhoulders, and to incline them a little forwards, principally with a view to relax the abdominal muſcles, but in part to prevent the weight of the body falling wholly upon the legs. He was held in this poſture ten or fifteen minutes while the taxis was applied, and, by repeating the ſame proceſs three or four times (allowing him to reſt at intervals) the hernia was reduced, without having recourſe to the warm bath.

"Aperients and a truſs were directed for him, and he was diſcharged cured on the 30th.

Case II. "January 15, 1796, William Howarth was admitted with an inguinal hernia, which had been incarcerated twenty hours. The moſt urgent ſymptoms were ſingultus, vomiting, and pain.

"After ſixteen ounces of blood had been taken from his arm, he was placed in the inverted poſition, and the taxis was applied, at intervals, till the warm bath was ready; ſeveral efforts were alſo made while he was in the bath to reduce the hernia, but were ineffectual. He continued in the bath till he began to grow faint; he was then removed to bed, and, in about an hour after, the reduction was completed, by again having recourſe to the inverted poſition and the taxis.

Case III. "March 4, 1796, Job Morton ruptured himſelf by endeavouring to ſtop a reſtive horſe. Several hours had elapſed when he ſent for me. The hernia was an inguinal one, in a tenſe and painful ſtate. He had vomited ſeveral times. The means made uſe of were venæſection, the inverted poſition, and the taxis, which were happily ſucceſsful.

CASE IV. " Jan. 20, 1798, Richard Perry, ætat. 40, was admitted with an incarcerated inguinal hernia. The ſymptoms, mode of treatment, and the reſult, were exactly ſimilar to the firſt caſe. He was diſcharged cured in a few days.

CASE V. " William Bellows was admitted the ſecond time (ſee Caſe I.) About ſixteen hours had elapſed ſince he found himſelf unable to return the hernia. He was bled, and the warm bath was ordered; but before it was ready, the complaint was removed, by placing him in the inverted poſition, and applying the taxis.

CASE VI. " March 17, 1799, William Bellows was brought to the Infirmary at three o'clock, A. M. About ſix hours had elapſed ſince he found himſelf unable to reduce his hernia.

" He complained of great pain, and hiccuped at times. Attempts were made, but in vain, to reduce it by applying the taxis, having previouſly raiſed his hips by placing pillows under them. About a pint of blood was then taken from his arm; a purging clyſter was injected, which brought away a ſtool in about half an hour; a cold ſolution of ſal ammoniac was applied to the part affected, and caſtor oil was ordered internally, which procured him ſeveral evacuations.

" Between ſeven and eight o'clock he was put into the warm bath, and felt eaſier afterwards, though the tumor continued of the ſame ſize, but felt rather ſofter. About two hours after he left the bath, he was held by the legs on the ſhoulders of an aſſiſtant, and the taxis was applied nearly a quarter of an hour, but the hernia was not reduced; he was then laid down in bed, and a ſickneſs came on, and during the continuance of the ſickneſs it went up.

CASE VII. " May 13, 1799, James Taylor had experienced the moſt excruciating pain four hours, from an incarcerated inguinal hernia.

" The inverted poſition was not reſorted to for want of proper aſſiſtants; but the patient's head being lowered, and his hips elevated as much as poſſible, brought him nearly into that poſition; and the hernia was ſpeedily reduced by applying the taxis."

Mr. Ward adds to theſe caſes the following remarks:

" If," ſays he, " we admit the propriety of placing the patient, when the taxis is to be applied, in ſuch a poſition as may moſt effectually co-operate with the ſurgeon, the inverted poſition ſeems in every point of view fairly entitled to a preference, not only in the inguinal and ſcrotal, but alſo in the congenital and femoral herniæ; and whoever will reflect on the connection which ſubſiſts between the parts above and below the ſtricture, will be inclined, I think, to draw a ſimilar concluſion.

" But this is a matter which does not reſt on theory entirely; the experience I have already had of its utility, enables me to ſay, that more benefit actually takes place from the taxis when the patient is placed in an inverted poſition, and with leſs violence or injury to the diſplaced viſcera, than when any other poſition is made uſe of; an equal degree of preſſure being applied in both caſes.

"The alarming ſituation of William Howarth (Caſe II.) induced me both to repeat the taxis oftener, and alſo to apply a greater degree of preſſure before the reſiſtance could be overcome, than I had ever done before; and it is to theſe cauſes, and having availed myſelf of the moſt favourable poſition, that my ſucceſs is to be attributed, not only in this but in the three ſucceeding caſes.

"I ſhould be ſorry to be wanting in that reſpect which is due to the opinions of men deſervedly eminent in their profeſſion; but I muſt beg leave to withhold my aſſent from the injunction which would limit the ſurgeon to gentle preſſure in every inſtance. 'A little time and pains ſpent in this manner will frequently be attended with ſucceſs, and obtain a return of the part; but if it ſhould not, and the handling of it (which I muſt repeat ſhould always be gentle), becomes painful and very fatiguing to the patient, we are adviſed to deſiſt for a few hours, and try the effect of other means.' *Potts' Works, vol. ii.*

" 'But this muſt always be had in view, that any preſſure that is applied muſt be of the moſt gentle kind; for every thing of this nature that creates much pain, is very prejudicial, and ought by all means to be avoided.'—*Bell's Surgery, vol. i.*

"Whoever regulates his practice by the above rules, will, I believe, rarely ſucceed in reducing thoſe herniæ that are accompanied by a conſiderable degree of ſtricture.

"I truſt, however, it will not be imagined I am an advocate for a rude or violent method of applying the taxis; every addition to the preſſure applied, ſhould certainly be made in a cautious and gradual manner; but at the ſame time it will be incumbent upon us to remember, that ſhould we fail in reducing the hernia, the patient muſt either ſubmit to an operation, which often terminates fatally even when performed under the moſt favourable circumſtances, or to the almoſt inevitable alternative of a gangrene taking place, with all its attendant evils.

"In the treatment of a complaint ſo dangerous in its nature, and ſo rapid in its progreſs, that the fate of the unfortunate ſufferer is frequently decided in a few hours, it appears highly injudicious to allow a conſiderable portion of that precious time (which ought to be appropriated to the uſe of the moſt efficacious remedies) to be occupied in applying cold liquids, or ice, to the part affected*.

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* Mr. Potts' remarks in his Treatiſe on Hernia, when cautioning his readers againſt employing fomentations, cataplaſms, and embrocations, are very forcible, and appear to me not very inapplicable in the preſent inſtance. "I know that in this I differ from the majority both of writers and practitioners; but having (as I think) truth on my ſide, I do again venture to ſay, that I verily believe, that the confidence which has been placed in ſuch kind of applications, has deſtroyed many more lives than it has ſaved. A hernia, with

"Where cold topical applications are ſo managed as not to divert the attention of the ſurgeon from meaſures of more eſſential importance, my objections will not apply; but having reaſon to believe that great confidence is ſometimes repoſed in them, and being convinced of their general inutility, I cannot help thinking it would be a happy circumſtance were they totally diſcarded in the treatment of every ſpecies of incarcerated hernia.

"In the intervals, when patients of the above deſcription are not undergoing the taxis, or uſing the warm bath, might it not promote the object in view (or at leaſt retard the progreſs of inflammation) were they to be laid in bed with the head and ſhoulders lowered, and the hips elevated conſiderably, inſtead of being allowed to lie in the uſual horizontal poſition?

"However trivial ſuch a circumſtance may appear, nothing ought to be conſidered beneath notice, which may in any degree tend to promote eaſe, or diminiſh danger."

Mr. Simmons, of Mancheſter, publiſhed a caſe, in which good effects were attributed to the exhibition of digitalis. His colleague at the infirmary, however, Mr. Killer, in a ſubſequent paper, diſſents from this concluſion. The patient was admitted under the care of Dr. Taylor, who directed ſeveral leeches to be applied to the ſcrotum, a large doſe of calomel, and that he ſhould go into the warm bath. By theſe means the volume of the tumor was conſiderably diminiſhed; however, as reduction was ſtill impracticable, a conſultation was held, and the plan of treatment deſcribed by Mr. Simmons agreed upon. A grain of digitalis was given, and in a quarter of an hour after, and before it had produced any ſenſible effect, a ſtrong tobacco clyſter was thrown up. This brought on ſickneſs and violent retchings inſtantaneouſly, which continued till the patient was reduced to a ſtate of aſphyxia. Whilſt in this condition, the hernia was reduced with tolerable facility.

Mr. Killer does not deny that the addition of a ſedative power, like that of digitalis, might increaſe the conjoining debilitating effects of bleeding, the warm bath, and tobacco clyſters, but conſiders the exhibition of the former as no other than a ſlender auxiliary to ſuch powerful means.

The invaluable Caſes and Obſervations on Strangulated Hernia, by Mr. Home, which appear in the Tranſactions of the Society for

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painful ſtricture, and ſtoppage of ſtools, is one of thoſe caſes in which we can ſeldom ſtand ſtill even for a ſhort ſpace of time; if we do not get forward, we generally go backward; and whatever does no good, if it be at all depended upon, certainly does harm, by occaſioning an irretrievable loſs of time: of this kind I take the cataplaſm and embrocation to be; while the former is applied, or the latter uſed, no other more powerful means are made uſe of; and though it has the appearance of doing ſomething, yet I fear it is little more than ſpecious trifling; eſpecially if the caſe be at all preſſing."

Works, vol. ii. p. 69, 70.

promoting Medical and Chirurgical Knowledge, are by no means to be paſſed by. We ſhall, therefore, cloſe this ſection by giving them in detail.

"In caſes of ſtrangulated hernia," ſays Mr. Home, "ſome require an operation to be performed a few hours after ſtrangulation has taken place, while others admit of an operation being much longer delayed.

"There are general ſymptoms common to all ſuch caſes, but theſe different kinds appear to have alſo ſymptoms peculiar to themſelves. To aſcertain theſe peculiar ſymptoms would enable us to decide upon the nature of each particular caſe, and to determine the moſt proper time for performing an operation."

With a deſign of throwing ſome light upon ſo important a ſubject, Mr. Home annexes the following caſes:

Case I. "Elizabeth Walbank, fifty-four years of age, of a ſpare habit of body, had for ſeven years a femoral omental rupture on the left ſide, which had never been reduced. On the 31ſt of October, 1794, at eleven o'clock in the evening, immediately after a ſevere fit of coughing, ſhe felt a pain in the part, and had a violent attack of vomiting, accompanied with a general tenderneſs over the belly. The retchings returned at intervals during the night; next day all theſe ſymptoms became more ſevere; ſome blood was taken from the arm, and attempts were made to reduce the rupture, but not proving effectual, ſhe was ſent to St. George's hoſpital, and became my patient. I ſaw her," ſays Mr. Home, "at eleven o'clock in the evening, exactly twenty-four hours after the ſymptoms of ſtrangulation had taken place. Her pulſe was quick and ſmall, her ſkin dry and hot to the touch, the retchings were extremely violent, attended with pain, and a ſenſe of dragging down (as ſhe expreſſed it) from the navel, which returned about every five minutes; there was alſo a great degree of tenderneſs over the belly, and the tumor itſelf gave pain when handled.

"The tumor was about the ſize of half an orange, was diſtinctly to the feel compoſed of omentum, and was ſo ſituated as to preclude all examination of Poupart's ligament by the finger; nor could the hernial ſac, on account of its diſtenſion, be removed from that ſituation. Any efforts to reduce a rupture, ſo circumſtanced, are generally unavailing, and in this caſe they did not ſucceed. The warm bath was employed, and the fumes of tobacco were injected into the rectum, but no abatement of the ſymptoms took place.

"The woman ſuffered ſo much from the vain efforts to vomit, and the general ſtate of irritation, that ſhe readily conſented to have the operation performed, as ſhe felt within herſelf that ſhe could not ſurvive unleſs ſomething effectual was done for her relief.

"When I laid open the hernial ſac in the uſual manner, nothing except omentum was brought to view; but when this was ſpread out, and turned up towards the abdomen, a ſmall tumor, formed by a doubling of the inteſtine, was diſcovered at the bottom of the ſac; which was ſo much preſſed upon by Poupart's ligament, as not to admit the end of a probe to paſs between them. The gut was very much inflamed, its ſurface was perfectly ſmooth, and uniformly of a dark red colour, but as mortification had not taken place, it was thought to be capable of recovery, and was, therefore, as ſoon as the ligament was divided, returned into the belly. The portion of omentum adhered to the orifice of the hernial ſac, and was found upon trial too bulky to paſs through the orifice which led to the abdomen; it was therefore, from neceſſity, removed; this was done by dividing it in its expanded ſtate, near to the orifice of the ſac, with a pair of ſciſſars; two arteries on the cut edge bled ſo violently as to require being ſecured by ligatures, the ends of which were brought out at the external wound, and the whole was ſuperficially dreſſed*.

" As the portion of gut was very much inflamed, twenty drops of tincture of opium were given, immediately, to leſſen the irritation produced by the inflammation, and repeated at four o'clock in the morning.

" January 2d. The retching was entirely ſtopped, and the pain in the belly much abated. A clyſter of warm water was injected, and fifteen drops of tincture of opium given in a draught, both of which were repeated at night. The clyſters were only retained about an hour.

" 3d. She was tolerably eaſy, but languid; the clyſter of warm water was repeated; at ten o'clock in the evening ſhe had a pain in the lower belly, for which ſhe took twenty drops of tincture of opium: the ſame quantity of opium, in conſequence of a continuance of the pain, was repeated at one in the morning.

" 4th. The pain continued, accompanied with a conſtant deſire to make water; the belly was fomented, after which ſhe made water freely, and this relieved the pain in the belly. At two o'clock ſhe took an ounce of a mixture containing ℥vj of infuſion of ſenna, ʒvj of tincture of ſenna, and ʒiij of kali tartariſatum, and in an hour had a motion; her pulſe was ſoft, and beat an hundred times in a minute; her thirſt continued, but was relieved by ſucking oranges. She took ſome panada, ſago, and her uſual opiate at night.

" 5th. Had a confuſion in the head, with diſturbed dreams: theſe were conſidered as effects of opium, which was therefore left off. The wound had a favourable appearance.

" 7th. The ligatures came away, and the wound was going on kindly.

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* Mr. Pott diſapproves of tying the omentum, as inflammation often extends from the part included in the ligature along that membrane, and deſtroys the patient. He alſo ſays, that *hæmorrhage* will probably never take place on cutting it, but this caſe proves the reverſe.

"9th. She became reſtleſs, feveriſh, languid, and had no appetite for food; all theſe ſymptoms increaſed on the 10th, and on the 11th, at night, ſhe died, exactly ten days after the operation.

"On inſpecting the body after death, the ſtrangulated portion of inteſtine, extending to two inches and a half of the ilium in length, was found to have exactly the ſame appearance as it had when expoſed during the operation. Its internal membrane was extremely vaſcular, and had an inflammatory exudation of coagulated lymph adhering to different parts of its ſurface. There was no appearance of inflammation on the omentum. So large a portion of it had been removed during the operation, that only an inch of its anterior part remained attached to the tranſverſe arch of the colon. In ſeveral parts of the abdomen there were ſlight adheſions between different convolutions of the inteſtines.

"In this caſe the ſymptoms were, from the beginning of the attack, thoſe of an inflamed inteſtine: the operation arreſted the progreſs of the inflammation, and prevented mortification from taking place; but the inflammation had proceeded too far to admit of reſolution.

CASE II. "Edward Linton, ſixty-four years of age, had for nine years a ſcrotal hernia on the left ſide, which was in general without much difficulty reduced. On the 26th of January, 1795, about four o'clock in the morning, after a fit of coughing, the tumor was increaſed by the gut being forced down, as had frequently happened before, but ſymptoms of ſtrangulation now took place. In the courſe of two hours a vomiting came on, which ceaſed as ſoon as the ſtomach had diſcharged its contents, nor did it return till ſomething was again received into the ſtomach. He continued in this ſtate, and the vomiting was rendered frequent by the inceſſant thirſt obliging him to drink frequently. At nine o'clock on the evening of the 29th, he was brought to St. George's hoſpital, and put under my care. His pulſe was an hundred in a minute, and by no means unuſually ſmall; his tongue was white, his mouth dry, and he was much diſtreſſed by hiccup; there was no pain extending over the belly, or in the tumor formed by the rupture, unleſs what aroſe from its having been much handled.

"Upon finding my attempts to reduce the rupture ineffectual, I cut down upon the ring of the external oblique muſcle, and divided it with a view of taking off the ſtricture, relieving the ſymptoms, and rendering the parts afterwards more eaſy to be reduced. The tumor immediately felt ſofter, and appeared to be diminiſhed in ſize; he was therefore left in this ſtate, the parts having been ſuperficially dreſſed, till next day.

"January 30. The ſymptoms were in no reſpect relieved, and the rupture could by no means be reduced; it was therefore thought right to perform the operation. The ſac was laid open, was found to be extremely thick, and contained about an ounce of water; a portion of the inteſtine was diſcovered cloſely embraced by the orifice of the ſac, in appearance free from inflammation, and was returned with ſome difficulty into the cavity of the abdomen. The wound was ſuperficially dreſſed, and an opiate was given to quiet the ſtomach.

"31ſt. The hiccup and vomiting continuing, opiates were given; a clyſter compoſed of a pint of milk and two drachms of aloes, was injected; and another of the ſame compoſition was repeated in a few hours, both of which were returned without relieving the conſtipation.

"February 1ſt. No abatement of the hiccup and vomiting. A clyſter, conſiſting of a pint of milk, with half an ounce of aloes, was thrown up without procuring a motion. His pulſe was full and ſtrong, there was a great degree of inflammation in the wound, extending up to the ſpine of the ilium, and down to the teſticle: ℥viij. of blood were taken away from the arm, and two grains of opium were given at bed-time.

"2d. The vomiting was leſs frequent; he took five grains of calomel and ten of jalap, about noon, and the aloetic clyſter was adminiſtered as before, which procured a ſtool in the evening; this was the firſt evacuation ſince the ſtrangulation, a period of eight days in all, and three from the time of the ſtrangulation being removed.

"3d. The vomiting abated, but the hiccup was troubleſome; the calomel and jalap were repeated, and a clyſter of warm water was thrown up, but no evacuation took place.

"4th. The calomel and jalap, and the aloetic clyſter, were repeated. He had a ſtool in the afternoon, and another in the night.

"5th. The vomiting entirely ceaſed, but the hiccup, and a degree of nauſea, continued.

"6th. "Ten grains of calomel, and ten of jalap, were given, and he had four copious evacuations.

"7th. The hiccup continued. In the afternoon the calomel and jalap were repeated.

"8th. He had a good night, the hiccup being only at intervals; he had no motion; the calomel and jalap were therefore repeated.

"9th. The hiccup had not entirely left him, and he had two copious ſtools. The inflammation had ſpread from the external wound to the teſticle, and ſuppuration had taken place through the whole extent of the ſcrotum; a hæmorrhage took place in the evening, which made the removal of the teſticle neceſſary, in order to ſecure the veſſel. He loſt above a pound of blood, which made him low and faint; and he was directed to take three grains of opium.

"10th. He had a tolerable night, the hiccup being entirely gone. From this time there were no ſymptoms of the bowels being affected. In three days the evacuations became regular, and afterwards, when otherwiſe, the bowels were readily acted on by mild laxatives. He gradually recovered his ſtrength, and in the beginning of April was quite well."

Mr. Home obſerves on this caſe, that there was no inflammation in the ſtrangulated part of the gut, though it remained four days and a half in that ſtate. The ſymptoms aroſe entirely from the obſtruction to the paſſage of the contents of the bowels, producing irritation in the ſtomach, and the other effects which the author has enumerated.

"Case III. Margaret Collins, aged forty, had for a year a femoral rupture of the left ſide, which was readily reduced. On March the 28th, about five in the evening, while ſtanding on a ladder, cleaning ſome wainſcot, a portion of the gut came down. She felt immediately a darting pain between the navel and pit of the ſtomach, very quickly followed by giddineſs, ſickneſs, and vomiting, which did not ceaſe upon the ſtomach being emptied, but continued for ſome time, and returned at intervals. Whatever was taken into the ſtomach was immediately rejected, and at ſuch times ſhe felt a very ſevere pain in the tumor, and the region of the ſtomach.

"29th. The ſymptoms continued the ſame, and for about ten minutes ſhe had hiccup.

"30th. About ſix in the evening, ſhe was brought to St. George's hoſpital, and fell under my care. Her pulſe was frequent, her tongue white, and ſhe had a great degree of thirſt. The tumor was leſs than a hen's egg, and ſituated directly upon Poupart's ligament. Fourteen ounces of blood were taken from the arm; attempts were made to reduce the rupture, which proving ineffectual, recourſe was had to the warm bath; tobacco fumes were injected, and ice was applied externally, but all without ſucceſs. The ſymptoms ſuggeſted the opinion of an inflammation having taken place in the portion of ſtrangulated inteſtine. They were not, however, in the ſame degree as in the caſe firſt ſtated, as the pulſe was leſs contracted, the retchings leſs frequent, and the general irritation and pain in the belly leſs violent. It was thought proper to proceed to the operation, which was performed at eleven at night.

"When the hernial ſac was laid open, a ſmall fold of inteſtine was expoſed, having its external ſurface very vaſcular, and a ſhaggy appearance, from a covering of coagulating lymph which adhered to it; this was become vaſcular: the gut itſelf was alſo much thickened in its coats. The ſtricture was removed by dividing Poupart's ligament, the gut was returned into the belly, the external wound was ſuperficially dreſſed, thirty drops of tincture of opium were given in order to allay irritation, and in the night a clyſter, conſiſting of warm water, was thrown up. Immediately after the operation ſhe appeared to be relieved, and the retching entirely ceaſed.

"31ſt. Her pulſe was an hundred and two in a minute. She was very thirſty, had hiccup for about ten minutes; had a pain in the lower belly, which went off upon making water. She took an ounce of the laxative medicine which was exhibited in the firſt caſe, but without effect; at noon ſhe took ten grains of calomel and ten of jalap, and at four in the afternoon a clyſter was thrown up, conſiſting of a pint of milk, with ℥ſs of aloes: at ten at night the calomel and jalap were repeated, with a view to empty the bowels as quickly and completely as poſſible, on account of the inflammation in the ſtrangulated portion of the inteſtine.

"April 1ſt. She had two copious ſtools; her bowels were eaſy, except that flatulency ſometimes took place. She was leſs thirſty, the pulſe ſoft, low, and ninety-four in a minute. She had another motion about four o'clock. In the evening the jalap was repeated, with ſeven grains and a half of calomel.

"2d. She ſlept well in the night, was free from pain, her pulſe ſoft, and eighty-two in a minute. The calomel and jalap were repeated, and as ſhe had no ſtool, the calomel was again repeated at night alone.

"3d. As ſhe had no ſtool, an aloetic clyſter was thrown up as before; the pulſe was now only eighty. At noon ſhe took twenty grains of jalap, and at two had a ſtool, and in the evening three more.

"4th. She had another motion in the night, after which ſhe was griped, but the griping went off on taking twenty drops of tincture of opium; ſhe reſted well, and her pulſe was ſeventy-five.

"After the 4th ſhe had no complaint in her bowels, the wound went on kindly, and ſhe got well in a fortnight.

"In this caſe the ſymptoms indicated inflammation, and the appearance of the inteſtine, when expoſed in the operation, proved that inflammation had taken place. There were alſo the ſymptoms of compreſſion having obſtructed the bowels, as they remained in an indolent ſtate for ſome time after the operation."

Mr. Home's reflections, which follow, on theſe caſes, are particularly judicious. He ſays,

"From theſe caſes we learn, that the ſymptoms correſpond with the ſtate of the inteſtine. When the ſtricture is only ſufficient to compreſs the inteſtine, and to prevent the contents from paſſing through the ſtrangulated part, there is vomiting, hiccup, thirſt, and general uneaſineſs, which ſymptoms come on ſome hours after the protruſion of the gut, and are very ſlow in their increaſe.

"When the ſtricture is in ſo great a degree as to produce inflammation on the compreſſed part of the gut, the ſymptoms come on immediately; the vomiting does not ceaſe upon the ſtomach diſcharging its contents, but the retchings continue: there is a conſiderable tenderneſs over the whole belly; the pulſe is quick and very ſmall, and the ſpirits of the patient are much depreſſed. Theſe ſymptoms are more or leſs violent, and their progreſs is more or leſs rapid, in proportion to the degree of the inflammation. If it only produces adheſions, the pulſe is leſs contracted, there is leſs tenderneſs over the abdomen, and leſs depreſſion of ſpirits.

"When the ſtricture is ſo tight as to obſtruct the circulation of the blood in the part, all theſe ſymptoms are met with in the greateſt degree of violence; an unuſual coldneſs is felt over the ſurface of the body, and mortification takes place in the ſtrangulated portion of the inteſtine.

"As in all the caſes which I have ſtated, there was an opportunity both of tracing the ſymptoms, and examining the ſtate of the inteſtine, the concluſions which have been drawn are the more to be depended on; and ſhould they be confirmed by future obſervations, they will aſſiſt us conſiderably in judging of the expediency of performing the operation at an earlier period in ſome caſes than in others. I am induced to believe, that they are ſtrongly in favour of immediate operation in caſes which are in general thought to admit of delay.

"The femoral rupture, on account of the ſtrength of Poupart's ligament, will be more liable to have the parts compreſſed in a greater degree, and conſequently to be more violently affected by inflammation.

"In ſuch caſes the operation ſhould be ſooner performed; whereas, on the contrary, ſurgeons have been more inclined to delay it, from the difficulty and danger ariſing from the parts which are liable to be hurt in performing the operation.

"Conſtitutions are very differently affected by the ſame local miſchief; ſome patients recover after mortification has taken place in the portion of ſtrangulated inteſtine, while others ſink under a much leſs violent degree of inflammation; it is therefore in general right, even in the moſt hopeleſs caſes, to perform the operation. There is, however, one ſymptom that comes on in the laſt ſtage of this diſeaſe, which appears to be the immediate forerunner of death, and after it has taken place, I apprehend the operation will always prove ineffectual. This is a general coldneſs, attended with moiſture over the ſurface of the body; it is, to the feel, even colder than the ſkin of the ſame perſon when dead; but the real degree of cold (I believe) has never been meaſured by a thermometer."

Mr. Home concludes this intereſting paper by obſerving, that, in every caſe which had occurred to him, where this ſymptom had taken place, the patient was loſt. In ſome the operation was performed, in others not; but in all, the patients continued to ſink gradually, and died in leſs than twenty-four hours.

SECT. II. *Of* BUBONOCELE, *or* INGUINAL *and* SCROTAL HERNIA.

This ſpecies of hernia is formed by a protruſion of ſome of the abdominal bowels through the rings of the external oblique muſcles. It is known by the general ſymptoms of hernia already enumerated, and by a ſoft and ſomewhat elaſtic ſwelling, beginning in the groin, and deſcending by degrees into the ſcrotum in men, and into the labia pudendi in women. When the hernia contains omentum only, the ſwelling is both more ſoft, compreſſible, and more unequal than when the gut alone is down; the ſcrotum becomes more oblong than in the inteſtinal hernia; and when the quantity of omentum is large, it is alſo much more weighty than a gut rupture of the ſame ſize: but frequently the tumor is compoſed of both gut and omentum, and then the diſtinguiſhing ſymptoms of each can never be ſo clearly marked.

Diſtinctions.] Bubonocele may be confounded with certain other diſeaſes; but is diſtinguiſhed by the following marks which are preſent in theſe diſorders, while the ſymptoms of hernia are abſent: from venereal bubo, by the preſence of that incompreſſible hardneſs with which all ſuch ſwellings are at firſt attended, and by the fluidity of matter which in the ſuppurative ſtate is always obſervable: from hernia humoralis, or ſwelling of the teſtis, by the abſence of the hardened and enlarged ſtate of the teſtis and epidydimis, and likewiſe of the pain, the tumor of the teſticle being remarkably heavy in proportion to the bulk, and the ſpermatic proceſs being commonly free from ſwelling. In the hernia humoralis alſo the inteſtines are unobſtructed, and the general ſymptoms of hernia are wanting. From the hydrocele of the tunica vaginalis teſtis, by the tumor generally feeling more ſmooth to the touch than in hernia, by the ſwelling here beginning in the under part of the ſcrotum and aſcending, by the ſpermatic cord being always free and diſtinct, and by a fluctuation being evident. From hydrocele of the ſpermatic cord, ſometimes with much difficulty, and therefore it requires here particular attention. In every caſe of tumor in the teſtes, where the moſt perfect certainty is not obtained, and when it is neceſſary to have recourſe to an operation, the ſurgeon ought to proceed as in a caſe of real hernia.

Treatment.] The treatment of bubonocele is the ſame with that already adviſed in the treatment of hernia in general, only making allowance for the ſituation of the diſeaſe. In attempting the reduction by means of the hand, the preſſure ſhould be obliquely upwards and outwards, correſponding with the ring of the abdominal muſcle. In performing the operation, the patient ſhould be laid on a table, with his head and body almoſt horizontal, whilſt at the ſame time his buttocks are ſomewhat elevated by pillows placed beneath them. The legs hanging over the edge of the table ought to be ſeparated, ſo as to admit the operator between them; and ſhould in that ſituation be firmly ſecured by an aſſiſtant on each ſide, who ſhould take care to keep the thighs ſo far raiſed as to relax all the abdominal muſcles. The parts being previouſly ſhaved, an inciſion muſt be made with a common round-edged ſcalpel through the ſkin and part of the cellular ſubſtance, beginning at leaſt an inch above the ſuperior end of the tumor, and continuing it down to between two and three inches below the ring.

Although, in by much the greateſt proportion of hernial ſwellings, the ſpermatic veſſels lie behind the protruded parts, yet on ſome occaſions they have been found on the anterior part of the tumor; ſo that in order to avoid the riſk of wounding them, as ſoon as the ſkin is divided, the remainder of the operation ought to be done in the moſt cautious manner, care being taken to avoid every large blood-veſſel which makes its appearance. The ring muſt now be laid diſtinctly in view; a ſmall portion of the protruding ſac muſt alſo be expoſed; after which the director is to be introduced between the ring and the ſac, placing the point of the inſtrument obliquely upwards and outwards. A blunt-pointed biſtoury is now to be introduced into the groove of the director, and by it the ring is to be dilated till the point of the finger can be introduced. The director is now to be laid aſide, and the finger uſed in place of it through the reſt of the operation. After the operation is finiſhed, the dreſſings are to be applied, and the whole ſecured by a T bandage, or ſuſpenſory bag, properly ſtuffed with ſoft lint.

The patient, on being carried to bed, ſhould have a pillow under the buttocks, to elevate them a little above the reſt of the body, and ſhould be treated in the manner which has been already directed. As ſoon as the wound is firmly cicatrized, a truſs ought to be properly fitted and uſed through the reſt of the perſon's life. Females are liable to this ſpecies of rupture as well as men: and as the opening in the external oblique muſcles is exceedingly ſimilar in both ſexes, the treatment of this ſpecies of hernia in females is very ſimilar to what is found to anſwer in men. When clyſters, blood-letting, and the other remedies formerly enumerated, fail, the ſame operation of enlarging the opening in the tendon of the oblique muſcle is here equally proper as in the other ſex.

As modeſt women are apt to conceal diſorders of this kind, they may frequently happen when the ſurgeon receives no information about them. Whenever, therefore, ſuch ſymptoms of colic occur as give reaſon to ſuſpect the exiſtence of hernia, a particular examination ought always to be made, in order, if poſſible, to detect the cauſe of the miſchief, from the removal of which alone a cure can be expected.

See the remarks of Mr. Geoghegan in the preceding ſection.

SECT. III. *On the* MECHANICAL ASSISTANCE *to be afforded in Caſes of* RUPTURE.

As it is a fact univerſally acknowledged, that moſt if not all the benefit that patients who are afflicted with ruptures can derive from the aſſiſtance of art, if exerted with a view to the radical, or only to effect a palliative, cure, is from the ſkilful application of proper truſſes, a knowledge of the principles upon which thoſe inſtruments ſhould be conſtructed becomes of the utmoſt importance: to this ſubject we have paid much attention, and ſhall, as briefly as poſſible, mention the reſult of our enquiries.

In the capital, ſeveral perſons offer to public notice what they call new inventions of this kind, but, upon a minute inveſtigation, every one of theſe appears to reſemble ſome bandage that is deſcribed by the older writers on this ſubject; and as theſe were laid aſide upon the invention of what is called the elaſtic truſs, which has been univerſally uſed for more than ſixty years, we have not heſitated to recommend *that* as the moſt proper to be adopted in moſt caſes. We adviſe thoſe who have occaſion for them to procure them from thoſe makers whoſe known ſkill and reputation afford a well-founded hope that they will be properly executed; in this much caution ſhould be uſed, as it is notorious that many workmen of the moſt ignorant deſcription pretend to make and even apply truſſes, moſtly to the injury, and often to the deſtruction, of their patients. The effect of this raſhneſs in ignorant men cannot be too carefully guarded againſt; but, as there are ſituations where better cannot be found, we ſhall endeavour to give ſuch an idea of the principles upon which they ſhould be conſtructed as will enable our readers to direct a common workman to make them much better than he would otherwiſe do. Upon this ſubject we have been favoured with the following communication by Mr. Sheldrake *, whoſe reputation in this way, as well as in other branches of mechanics that are connected with ſurgery, is perfectly well known.

"As every rupture, when the patient is ſtanding erect, but is otherwiſe inactive, is protruded, by the mere effect of gravity, with a force proportioned to the weight of the parts, and as the ſame rupture, when the patient is in a ſtate of exertion, is protruded with a force equal to the weight of the parts and the quantity of exertion that is made, it is evident that a truſs which is intended to keep up a rupture of a given ſize, in a patient whoſe mode of life is known, ſhould poſſeſs a degree of ſtrength more than equal to any action the parts may be thrown into by any exertion the patient may uſe: it is to be remarked too, that two ruptures of the ſame ſize, the one conſiſting of omentum, the other of inteſtine, will require truſſes of different degrees of ſtrength to keep them up, ſuppoſing the patients to uſe equal exertion. There are other circumſtances to be conſidered which prove that a certain degree of force is indiſpenſably neceſſary to keep up a rupture of any given ſize, that a large rupture requires more force to retain it than a ſmall one, and of courſe that a truſs for the one cannot be ſo eaſy to the wearer as that for the other. This is too evident to require mentioning to a well-informed mind, but many patients are too irritable to believe it; they are miſled by the pretences of thoſe who fooliſhly as well as falſely pretend that the largeſt rupture may be kept up without the truſs being felt.

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* As we wiſh to give an authority for what we introduce, and are deſirous that the author of every communication we are favoured with ſhould receive the ſhare of credit that may be due to his work, we are here bound to acknowledge our obligations to Mr. Timothy Sheldrake (No. 50, in the Strand), author of Obſervations on the Cure of Ruptures, &c. and of an Eſſay on the Diſtorted Spine; and who has long been diſtinguiſhed for his method of treating, on entirely new principles, diſtortions in the legs and feet of children and adults. We are the more particular in the terms of this acknowledgment, from the neceſſity there is of diſtinguiſhing *this* gentleman from a perſon of the ſame name, engaged in the ordinary buſineſs of a truſs-maker, in his immediate neighbourhood.

"It is certain however, that many patients ſuffer very ſeverely and much unneceſſary pain from the preſſure of truſſes improperly made, or injudiciouſly applied; and this they, as well as ſome deſigning men, are willing to attribute to the ſpecies of truſs, when in fact it is only a fault from the improper manner in which that particular truſs is conſtructed, or the injudicious manner in which it is applied; for this, perhaps, there is no other remedy than to apply to thoſe men whoſe experience makes them equal to the taſk; for on this ſubject much knowledge is gained by experience that cannot be obtained in any other way: yet, taking it for granted that a certain degree of force is requiſite to keep up every rupture, ſome rules may be given to apply that force in the moſt effectual manner, and with the leaſt inconvenience to the wearer. There are two efficient parts in an elaſtic truſs, viz. the ſprings and the pad; the latter is of ſome ſubſtance ſufficiently firm to preſerve that form which is once given to it, and muſt be made of that form which is beſt adapted to the ſtate of the rupture on which it is to be applied. The variation of different caſes in this particular is ſo great that perhaps there is no form that human ingenuity can deviſe that has not already been uſed in ſome caſes: the ſpring is intended, by its preſſure, to keep the pad to its place and prevent the extenſion of the rupture: the covering is merely to guard the body from injury, and is not now the ſubject of conſideration.

"The ſpring ſhould go ſo far round the body that the part which lies upon the back ſhould take a firm poſition upon that part, and form a baſis from which the action of the whole is directed to the pad, and the compreſſion is made by contraction of that part of the ſpring which lies upon the ſide. A ſpring of this kind can only act well by contraction, when the contracting part is circular: yet, as the body in that part is ſeldom round, and it is always deſirable that the truſs ſhould fit as cloſe to the body as poſſible, a conſiderable difficulty ariſes from the neceſſity of reconciling theſe ſeeming contradictions: this, indeed, is one great difficulty in the art of making truſſes; and, as many of the unqualified perſons who attempt it find it inſurmountable, their truſſes are too commonly both awkward and painful. Another great difficulty is to apply the requiſite degree of force, ſo as to produce the leaſt poſſible inconvenience to the patient; the manner of doing this may perhaps be underſtood from the following deſcription. The ſtrength and flexibility of a ſpring depend upon two circumſtances; viz. the ſize of the metal it is made of, and its capacity for being extended. If two ſprings are made of the ſame ſized metal, and one of them is formed into a circle whoſe diameter is half as much as that of the other, its ſtrength will be double when they are extended to the ſame ſize; or it will be equal in ſtrength to the other when it is half extended and the weaker ſpring is opened to its full extent. The whole force with which any ſpring is capable of acting muſt be equally divided between the point of its extreme extenſion and that point of its contraction when it is perfectly at reſt; if, therefore, theſe two ſprings were applied on the ſame patient, and if the weakeſt had ſufficient ſtrength to keep up his rupture, it would do ſo with eaſe; and the ſtrongeſt would likewiſe produce the effect, but with double the preſſure requiſite, and conſequently with ſo much unneceſſary pain as would be produced by one half the preſſure it makes.

"That truſs will be eaſieſt, then, which is the moſt flexible; but it will only be effectual when applied to a ſlight rupture in a patient who makes but little exertion; when the rupture is large, and it is requiſite the patient ſhould make violent exertions, a ſtrong truſs becomes indiſpenſably neceſſary, and it is often a difficult matter to adapt it ſo as to anſwer its purpoſe effectually, and at the ſame time be ſo eaſy as to enable the wearer to take his accuſtomed exerciſe with tolerable eaſe. In ſpeaking *generally* on the ſubject, it may truly be ſaid that the ſimple elaſtic truſs is the beſt; as it will, if ſkilfully made and properly adapted, anſwer extremely well unleſs in very large ruptures, or for patients who are required to make very violent exertions; in theſe caſes the ſimple elaſtic truſs is liable to ſome objections which may be obviated by a truſs of a different kind.

"The effect of the ſimple truſs is produced by its contracting round the body; now, although this contractile action may be ſo regulated in general and in ordinary caſes, as to produce no inconvenience, there are many in which the proper preſſure cannot be produced without inconveniences of the moſt ſerious kind. If we advert to the caſe of a very fat man, who has a very large rupture, and is required to exert himſelf with much activity, it is evident that ſuch a rupture can only be kept up by the preſſure of a very ſtrong truſs, which, contracting round the body ſo as to depreſs the pad at one of its ends through the depth of two or more truſſes of the ſoft parts before it can act upon the abdominal ring, muſt produce violent pain and excoriation on all that part of the body on which it lies; to obviate this inconvenience, the following improvement is always effectual.

"Inſtead of a ſimple circular ſpring, with the pad fixed immovably to it, which is the mode of conſtructing the common truſs, the pad of the improved truſs is connected with the circular ſpring by means of another ſpring, which, at the ſame time that the circular ſpring keeps it exactly in its proper ſituation, increaſes the power of motion and compreſſion in the pad ſo much that it produces a firm, equal, and gentle preſſure upon the part, in whatever ſituation the patient may place himſelf: and as almoſt half the preſſure that is required to keep up any rupture may thus be produced by the pad only, the circular ſpring need not be more than half ſo ſtrong as in a truſs of the ſame ſtrength of the common conſtruction; by this means *ſo* much of the inconvenience as is produced by the circular ſpring of the common truſs may be avoided." Mr. S. firſt publiſhed the deſcription of this truſs in 1781, and has invariably uſed it in bad caſes ever ſince, and always with complete ſucceſs.

"When a proper truſs is provided, it is neceſſary that the patient ſhould be well inſtructed in the uſe of it, and his medical attendant ſhould ſuperintend the uſe of it till the patient is able to manage it himſelf. The rupture ſhould be completely reduced, and the truſs ſo applied that the lower edge of the pad may lie even with the ſuperior edge of the os pubis; if it is placed higher than this, the rupture will deſcend; if it is placed lower, the ſoft parts will be compreſſed between the truſs and the pubis, and much unneceſſary pain occaſioned; the ſpermatic veſſels will become inflamed, and very painful ſenſations extend to the teſtes, which in ſome caſes have been permanently affected in conſequence of ſuch treatment.

"If, upon careful inſpection, the truſs ſeems to fit accurately, we ſhould not be diſcouraged if the rupture ſhould deſcend ſome time after the bandage is put on: for it frequently will happen, when a patient has not worn a truſs, that on its firſt application the rupture will deſcend in a ſhort time; it muſt then be returned, and the truſs replaced: if, upon a repetition of this for ſome days, however, the rupture is not perfectly retained, it may ſafely be concluded that the truſs is deficient in ſtrength, and a ſtronger muſt be provided.

"If on application of the truſs it ſhould excoriate the parts it lies upon, that effect may be produced by two diſtinct cauſes: peculiar delicacy of the parts, or friction from the truſs; the firſt may be remedied by topical applications, the latter may be prevented by interpoſing ſome ſoft ſubſtance, ſuch as fine flannel, or linen folded together to ſome thickneſs and laid between the body and the truſs; by this means the friction from the truſs will be exerted upon the interpoſed ſubſtance, and the body left perfectly at eaſe.

" The patient ſhould be cautioned never to be without his truſs while out of his bed; and even in bed there are many caſes where a truſs ſhould be worn: a patient who is troubled with a cough ſhould never be without his truſs, as coughing in bed is as likely to force down the rupture, as in any other ſituation; and thoſe who, from youth, or any other circumſtance, are likely to get perfectly cured, will increaſe the probability of a perfect cure by keeping the truſs conſtantly on.

" Two opinions have of late years prevailed reſpecting the application of truſſes; the firſt is, that the truſs ſhould be as eaſy as poſſible, conſiſtently with the patient's ſafety; the ſecond, that the truſs ſhould be as ſtrong as can be borne, becauſe its compreſſion may produce a certain degree of inflammation that will tend to reunite the parts, and thus effect a cure: in this mode of proceeding, the pain is certain, the probability of injuring the ſpermatic veſſels, and even the teſtes, great, and the benefits, if any, that may reſult from the practice, very uncertain; but in acting upon the former plan, the patient is kept in perfect ſafety, and at eaſe; he is certain of deriving every benefit that can be obtained from the uſe of the truſs, with as much eaſe as the nature of the caſe will admit, and therefore this ſeems to be the plan that ſhould be generally adopted in practice."

SECT. IV. *Of* HERNIA CONGENITA.

The teſtes in the fœtus are, till about the time of delivery, lodged in the cavity of the abdomen. When they deſcend into the ſcrotum, they puſh before them a portion of the peritonæum, which afterwards forms the vaginal coat. The paſſages by which they deſcend are ſoon ſhut up; but ſometimes the contrary happens, and then a portion of ſome of the abdominal viſcera paſſing down, forms that ſpecies of hernia to which new-born infants are liable, termed by Haller the *hernia congenita*. The teſticle and protruded inteſtine being here in contact with one another, the tunica vaginalis teſtis forms the hernial ſac.

It has been affirmed by ſome of the lateſt writers, that hernia congenita cannot be diſtinguiſhed from that contained in the common hernial ſac; and that though there was a diſtinction, it could be of no material uſe in practice. But Dr. Monro obſerves, that a hernia congenita may be diſtinguiſhed in an adult by an evident external mark; which is, that the bowels puſh down between the ſac and the forepart and ſides of the teſticle, ſo as often in a great meaſure to conceal it; whereas, in the common hernia, every part of the teſticle can be felt diſtinctly: and that it is of material uſe to make the diſtinction; becauſe in whatever manner we operate in hernia congenita, unleſs we take the utmoſt care to exclude the air, there will be a more violent inflammation, and greater diſtreſs than in common caſes, becauſe the teſticle will partake of the inflammation.

In the *treatment* of ruptures of the *congenital kind*, little difference occurs from the management of the common ſcrotal hernia; only a truſs ought never to be applied to infants, unleſs the teſticle can be felt in the ſcrotum, after the contents of the hernia have been reduced; as it would entirely prevent the deſcent of the teſticle, which yet remains in the abdomen. If any operation has been performed, the teſticle ſhould, immediately after the bowels are reduced, be covered with the vaginal coat, and at each dreſſing care ſhould be taken that the air be excluded. In every other reſpect the treatment of congenital hernia is the ſame with that of hernia in general.

SECT. V. *Of* FEMORAL *or* CRURAL HERNIA.

The ſeat of this ſpecies of hernia is upon the upper and forepart of the thigh; the protruded bowels paſſing out at the ſame opening through which the large blood-veſſels of the thigh are tranſmitted from the abdomen, and of conſequence under that part of the tendon at the upper end of the abdomen known by the name of *Poupart's* or *Fallopius's ligament*. Sometimes the bowels which protrude are ſituated immediately over the femoral veſſels, ſometimes on the outſide of theſe, but more frequently they lie upon their inner ſide. The diſeaſe is more frequent in women than in men, on account of the width of the female pelvis, and of conſequence the length and laxity of the ligament. The femoral hernia is more in danger of being confounded with inguinal hernia than with any other; the tumor, however, is deeper, and the ring of the abdominal muſcles, which lies entirely above the tumor in femoral hernia, completely ſurrounds the parts in that of the inguinal kind.

In the *treatment of femoral hernia*, when ſymptoms of ſtrangulation occur, we muſt uſe all the remedies commonly practiſed for herniæ in general; only that here, in attempting to reduce the parts by the hand, the preſſure ſhould be made directly upwards. An inciſion of ſufficient length is to be made through the integuments, ſo as to allow that part of the tendon which forms the ſtricture to be laid fairly in view: and after dividing the integuments, we are cautiouſly to cut the faſcia lata of the thigh, and ſeparate any glands which may come in the way till the ſtricture and part of the ſac diſtinctly appear. The ſtricture is then to be divided, by cutting fibre after fibre ſucceſſively. The ſpermatic veſſels in the male, or round ligament in the uterus in the female, may be avoided by cutting in a direction towards the umbilicus, carefully dividing the tendon tranſverſely. Some authors, from a ſenſe of the danger attending this part of the operation, have recommended merely to dilate the paſſage, inſtead of dividing the tendon; but in ſuch a ſituation, to attempt a further dilatation without the aſſiſtance of the knife, would probably be ſeldom attended with any advantage. After the parts are reduced, the wound is to be dreſſed as directed in the treatment of herniæ in general: a piece of thin leather ſpread with ſome adheſive plaſter retains the dreſſings better, and with much more eaſe, than any other bandage.

The following caſe of ſtrangulated *crural hernia*, where the operation ſucceeded after the obſtruction had continued ſix days, is publiſhed in the Medical and Phyſical Journal, by Mr. Borrett, ſurgeon, of Great Yarmouth:

" I was requeſted," ſays he, " to attend Mrs. Warner, of this place, in conſultation with four medical gentlemen. We found her with a *crural hernia* incarcerated, vomiting a quantity of fæcal matter, with hiccough, cold extremities, and a quick, ſmall, but irregular pulſe.

" The inteſtine had already been ſtrangulated five days, during which time the uſual treatment recommended for reduction was ſteadily but unſucceſsfully purſued. The tumor was about the ſize of a pullet's egg; and in conſequence of its not being tender to the touch, reduction was attempted, but without ſucceſs. The operation appeared the only chance to ſave her life, which was urged to her, but ſhe would not conſent. The cold applications were continued, pills compoſed of Ext. Colocynth. comp. and Calomel, and a grain of opium for a doſe, were preſcribed, and enemas of tobacco. At ten o'clock the following morning we viſited our patient. The enemas had acted powerfully on the ſyſtem, but produced no evacuation by ſtool; the vomiting of fæces continued. Being apprehenſive that ſhe could live very few hours, ſhe begged the operation might be performed, to which we agreed, as the only means of ſaving her life; although we now much doubted its ſucceſs, as her pulſe was become very feeble, and ſhe had the *facies hippocratica* ſtrongly marked.

" Every neceſſary preparation being made, I proceeded to the operation; expoſed the faſcia, ligamentum Poupartii, the hernial ſac, and its contents; I then divided the ligamentum Poupartii, and afterwards, with ſome difficulty, paſſed Pott's biſtory, and divided the ſtricture (which was conſiderable) at the mouth of the ſac. The rupture was Enterocele, and the portion of inteſtine included, which was the ſize of a nutmeg, appeared of a livid colour: preſſure upon the inteſtine gave pain, and excited retchings, which encouraged me to hope it had ſtill ſufficient life to have its action reproduced.

" The ſac had deſcended for fourteen years, and more than once ſuffered inflammation; it was thickened in conſequence, and reſembled a cod's ſound, and completely adhered to the ſurrounding adipoſe membrane; a great portion of it was diſſected out. The wound was drawn together by ſutures; light dreſſings were applied, and ſecured by a T bandage. Small opiates were ordered every four hours, to allay the irritability of the ſtomach, and ſupport her ſtrength; and broth clyſters, after ſome days, reſtored the natural periſtaltic motion of the inteſtines. Mrs. Warner was the mother of thirteen childen, and at this time in the third month of geſtation; ſhe did not miſcarry, and is now quite well: ſhe wears a truſs. This caſe, and many others recorded, ſhew, that the operation for hernia may ſucceed at almoſt any period of ſtrangulation, and encourage us never to deſpair of our patient."

Mr. Borrett's inducement for communicating the above caſe, aroſe from Mr. Geoghegan's having, in his " Strictures (noticed in our preceding pages) on the uſual Practice in ſtrangulated Hernia," repreſented the danger of the operation, abſtractedly conſidered, to be imminent, and eſpecially as that gentleman appears to be an advocate for procraſtination; from which the danger, in Mr. Borrett's opinion, wholly ariſes.

" Whoever," continues Mr. Borrett, " will conſult Pott on Ruptures, will ſee the moſt judicious treatment and decided reaſons for his mode of conduct, reſpecting the operation. ' There is no circumſtance,' ſays he, ' attending ruptures with ſtricture, in which more variety is found than in the time which they will ſafely admit to be ſpent in their reduction; ſome have been ſucceſsfully replaced at the end of eight or ten days, others have proved fatal in one.' The attention of the medical world ought, therefore, to be directed to the *time* when the operation, in different caſes of ſtrangulated hernia, ſhould be performed: from delay every thing is to be dreaded; and many valuable lives are daily loſt, that would indiſputably be ſaved. The ſurgeon who has a caſe of ſtrangulated hernia, ought not to waſte the only moments which might ſecure his patient's life by a *well-timed operation* in applying fomentations and placebos.—(Pott, p. 82, 83. vol. ii.) There is not, in the practice of ſurgery, a point which requires more judgment, firmneſs, or delicacy, than to determine the preciſe time beyond which this operation ſhould not be deferred, and for a ſurgeon to conduct himſelf ſo as to induce a patient to ſubmit to it early enough for his preſervation. The two principal circumſtances which have moſt contributed to the infrequency of performing this operation are, a dread of great hazard from the operation itſelf, conſidered abſtractedly, and a fear of bringing a diſgrace upon it by having performed it too late; ' *ne occidiſſe, niſi ſervaſſet videretur.*' The firſt then is vaſtly greater than it ought to be, and is moſt frequently the cauſe of the latter; ſo that if the one can juſtly be leſſened, the other will not be likely to happen. Few experienced men then can doubt the propriety of operating early in ſtrangulated hernia; after the moſt approved treatment has been regularly and conſiſtently tried without effect, and a judicious application of the taxis has been unſucceſsful, why ſhould the life of the patient be riſqued by further delay of the operation, in which, comparatively, there is no hazard, if it be judiciouſly performed? I am juſtified in this poſitive aſſertion if any inference may be drawn from ſix caſes, four of which (beſides the preſent) recovered. From one of theſe patients more than a pound of diſeaſed omentum was cut off, without hæmorrhage or any other diſagreeable ſymptom. Of the other two, one died from the operation being too long delayed; and the failure of the other depended on the ſtricture at the mouth of the ſac not having been completely divided; a point in the operation which requires great care and certainty.

"In the operation for Crural Hernia, the epigaſtric artery and ſpermatic chord in the male, and ligamentum rotundum in the female, are parts lying in the way of the knife, and particularly increaſe the difficulty and hazard of the ſucceſs of this operation. Benjamin Bell, in his account of the operation in Femoral Hernia, diſcourages us by ſaying, 'Whether the inciſion be carried directly upwards, or even obliquely outwards or inwards, theſe parts muſt generally be divided.' Pott is not more clear and determined, and recommends, after the hernial ſac, inteſtine, and ligamentum Poupartii, &c. are expoſed, to endeavour the return of the inteſtine before the diviſion of the ligament. Suppoſing every medical man perfectly acquainted with the anatomy of the parts concerned in Crural Hernia, I ſhall proceed directly to a deſcription of the operation.

"The patient being placed in a proper ſituation, the inciſion is to be begun above the tumor, laying bare the faſcia and the ſac. You then ſee the ligamentum Poupartii, binding down the ſac, which is to be divided; but as you will have the epigaſtric artery, and ſpermatic veſſels in man, croſſing each other *immediately over* the tumor, and in woman the epigaſtric artery and ligamentum rotundum, much care muſt be taken.—The beſt mode is, to make a ſmall inciſion between the fibres of the external oblique muſcle, about *half an inch* above the ligament, and a director being paſſed *carefully and immediately under the ligament, and over the artery* (which adheres to the ligament by cellular ſubſtance), to cut into the groove of the director. If, when this is done, you ſhould find the ſtricture at the mouth of the ſac, it muſt be divided *inwards* to the pubes, inclining Pott's knife rather obliquely downwards. In this mode you will avoid the artery, chord, and round ligament."

No clear account of the operation for the *crural hernia* having been given by authors, Mr. Borrett's inſtructions on that head cannot but be highly acceptable to the reader.

Sect. VI. *Of* other Species *of* Hernia.

Exomphalos.—In the exomphalos or umbilical hernia the parts protruded paſs out at the umbilicus, and are commonly the inteſtines, or omentum, or both; ſometimes part of the ſtomach, the liver, and even the ſpleen, have been found in the ſac. Here, as in other ruptures, the peritonæum forms the ſac, and in recent caſes it is generally very evident; but by the ſize of its contents, or a long continuance of the diſorder, it ſometimes becomes ſo connected with the ſurrounding parts, that by many its exiſtence has been doubted, and ſometimes the ſwelling has increaſed to ſuch a degree as to burſt even the ſkin itſelf. The diſeaſe occurs moſt frequently in infancy, ſoon after birth. In the adult ſtate, corpulent people are more ſubject to it than thoſe of a contrary habit; and pregnant women are particularly ſubject to it, on account of the ſize of the uterus. The diagnoſis in this diſeaſe is readily made, as the diſorder can ſcarcely be confounded with any other. If the diſeaſe be attended to in due time, a bandage properly fitted will generally effect a cure; and in ſuch ſwellings as occur in pregnancy, delivery will commonly remove the diſorder; but even in caſes of pregnant women, a bandage early applied and properly uſed will give conſiderable relief, till a cure can be applied by delivery. In this diſeaſe the omentum is more frequently puſhed out than any other viſcus; hence umbilical herniæ in general are not productive of ſuch bad ſymptoms as uſually occur in the other kinds of rupture. When, however, the inteſtines protrude, the uſual ſymptoms of a ſtrangulated hernia are apt to be induced; and when the means uſually employed for returning the gut into the abdomen do not ſucceed, a cure it is evident muſt depend entirely on a thorough removal of the ſtricture. In performing this operation, an inciſion through the integuments is the firſt ſtep to be taken, ſo as to expoſe the ſtricture of the tendon and the neck of the ſac. The ſtricture is to be removed in the manner already deſcribed; and as the tendon completely ſurrounds the neck of the ſac, the ſtricture may be cut wherever it can be moſt readily dilated. A radical cure ſimilar to that for the other ſpecies has been propoſed, but with as little probability of ſucceſs.

Ventral hernia.—The ventral rupture is a protruſion of ſome of the bowels through the interſtices of the abdominal muſcles, and is moſt frequently obſerved in ſome of the parts moſt contiguous to the linea alba. The treatment of this ſpecies of diſeaſe is exactly the ſame with that of exomphalos.

The following caſe of a fatal hernia of ſome of the abdominal viſcera ſtrangulated in the cavity of the thorax, by Dr. Clarke, appears in the Tranſactions of the Society in London for Medical and Chirurgical Improvement.

The patient was a man of a middle ſtature, about forty years of age. Till within the laſt two years he was generally healthy; but from his earlieſt years he had been occaſionally liable to head-achs, attended with nauſea. They ſeldom laſted more than twelve hours, and were generally relieved by vomiting.

About the end of December, 1793, he fell from a height, by which two of his ribs were fractured. The accident was followed by no unuſual ſymptoms, and he recovered from it very well.

After the fracture of his ribs, his head-achs became more frequent. He often felt in the region of the ſtomach, a degree of prominence or fulneſs, about the ſize of the palm of his hand, which gave him pain on the ſlighteſt preſſure, ſo that he was forced to wear his waiſtcoat open, or very looſely buttoned.

Through his whole life, but eſpecially ſince the fracture of his ribs, he had been ſometimes coſtive for ſeveral days. On ſuch occaſions, the tenderneſs and uneaſineſs of the epigaſtric region was much increaſed. The conſtipation commonly went off ſpontaneouſly, or yielded to gentle laxative medicines.

He had been occaſionally ſubject to violent pain in his left ſhoulder, particularly after eating a hearty meal; but never had any ſymptom of jaundice.

During the laſt twelvemonth, he had eaten his meals more irregularly than he had been accuſtomed to do before; to which he attributed an increaſe of the uneaſineſs of his ſtomach.

"About two days before I ſaw him," ſays Dr. Clarke, "he had taken more exerciſe than uſual without any refreſhment; and returning home much fatigued, he complained of a ſenſe of coldneſs. As it was late he miſſed his dinner, but drank tea and ate heartily of toaſt and butter. At ſupper, he made a plentiful meal of cold roaſt beef and porter.

"When he aroſe next morning, feeling a weight at the pit of the ſtomach, he took ſix drams of a ſaline purgative, without any effect. At two o'clock he made a hearty meal of boiled beef, which be ſwallowed haſtily in large pieces.—In half an hour he began to complain of pain in his bowels, and went to bed, where the pain increaſing, he drank ſome brandy and water, which he ſoon rejected by vomiting, along with the greateſt part of his dinner as he had ſwallowed it. The diſpoſition to vomit not ſubſiding, he ſent for Mr. Williams, of Vere-ſtreet, his apothecary, who viſited him about five o'clock in the afternoon of Friday, December 19th.—He then complained of pain reſembling a ſevere colic.—His pulſe was ſeventy in a minute, not full, nor tenſe: there was no remarkable heat on the ſkin, nor thirſt; nor was there any tenſion of the belly.

"Under the care of Mr. Williams he was blooded, went into the warm bath, and took ſeveral purgative medicines. He was afterwards attended by Dr. Milman, Dr. Pitcairn, and myſelf.—His belly was alſo fomented, and ſtimulating clyſters were injected without producing any evacuation of fæces.—This treatment was purſued between the 19th and 22d of December.

“ At this time vomiting occurred at intervals; the pulſe was not increaſed in frequency, but it had become rather fuller, and the patient complained of ſome tenderneſs and pain of the belly, when preſſed, which he had not done before. He hiccoughed frequently, but this ſymptom was ſo little urgent that it could be allayed by taking a little warm tea.

23d.—“ A clyſter, made of an infuſion of tobacco, produced no other effect than languor, aud fainting, with nauſea.

“ By this time, the belly was becoming more full and tenſe, with an increaſe of pain upon preſſure, eſpecially on the right ſide. A bliſter was now applied to his belly.

“ 24th, No favourable alteration had taken place. During the whole courſe of the diſeaſe, the patient had not been ſenſible of any motion in any part of the inteſtinal canal: the pulſe had never been more frequent than ninety in a minute. The pain was not commenſurate with the tenſion of the belly; and the ſymptoms altogether were milder than ſuch as commonly occur in caſes of long-continued inflammation of the inteſtines with conſtipation.

“ As none of the medicines had produced any good effect, electricity was applied to the belly twice on this day, with the intention of ſtimulating the inteſtines ſuppoſed to be torpid.

“ 25th.—Draughts compoſed of ſalt of hartſhorn with the camphorated mixture were given with the ſame view, but were quickly rejected by vomiting.—At this time, the patient complained of thirſt, and expreſſed a great inclination for brandy and water, which for the ſame reaſon was allowed, and he drank it plentifully. Some was alſo injected into the rectum.

“ During the laſt two or three days, though he had occaſional pain and vomiting, he ſuffered more from hiccough and a ſenſe of fulneſs, as if he ſhould burſt, or as if (to uſe his own expreſſion) the contents of his belly were now beginning to riſe into his throat. His breathing at this time became ſhorter, and more difficult; and this increaſed towards the evening of this day, when his hands became cold: he complained of much pain in the region of his heart; and early in the morning of Friday, December 26th (having retained his underſtanding to the laſt), he died.”

The following were the appearances on diſſection.

“ Externally the abdomen was very much ſwollen and tight to the feeling. Upon cutting into the cavity of the abdomen, the ſtomach and all the inteſtines appeared greatly diſtended with fluid, and ſhewed marks of inflammation, eſpecially at the limits of their mutual contact.

“ The inteſtines were glued together with coagulating lymph. The head of the colon adhered very firmly, by recent inflammation, to the ſurface of the neighbouring peritonæum. This part of the gut was enormouſly diſtended and inflamed; and that portion which lay in contact with the parieties of the abdomen, was of a very dark colour, as if it had been beginning to mortify.

"From the head of the colon, the large inteſtines were found filled with fluid contents, and bearing marks of inflammation on their outer ſurface.

"On the left ſide of the tranſverſe arch of the colon, the inteſtine appeared as if dragged up towards the diaphragm, above, and a little more forward than the ſpleen.—Here its courſe was rendered obſcure by the general fulneſs of the inteſtines, which entirely intercepted our view.

"The ſtomach, the whole of the ſmall, and part of the great, inteſtines were taken away, that we might better examine what remained.—We then found a part of the colon forced through an aperture in the diaphragm into the cavity of the thorax. This aperture in the diaphragm was on the left ſide, about three inches from the ribs, and ſituated more forwards than the natural opening for the paſſage of the œſophagus.

"From the connection of the colon with the epiploon, a portion of the latter was carried up along with it, as was alſo a part of the outer edge of the left lobe of the liver. The whole of this lobe was altered from its natural appearance. being very thin and flabby. This viſcus was altogether uncommonly ſmall; but in other reſpects it appeared healthy.

"The great inteſtines, below the ſtrangulation, were contracted in their whole courſe to the anus, contained no fæces, and had a perfectly natural appearance. All the other viſcera of the abdomen were ſound.

"On expoſing the left cavity of the thorax, we found the lungs ſo much collapſed, as not to occupy more than a third part of the cavity; but in other reſpects, they were in a natural ſtate.

"We next examined the viſcera, which had been forced through the perforation in the diaphragm.---The portion of gut was covered anteriorly with a ſurface of the epiploon. This, as well as the inteſtine itſelf, was in a high degree of inflammation. The inteſtine was completely full of fluid, ſo as to fill up the aperture of the diaphragm, and effectually to prevent all paſſage into, or out of it.

"Another circumſtance alſo preſented itſelf. The diaphragm near the inteſtine ſo protruded, was firmly connected by an old adheſion, about an inch in length, to the bony part of two ribs, exactly at that place where they had been formerly fractured. An irregular callus projected inwards, by a kind of ſpinous proceſs; and to this the diaphragm was attached.

"Upon the cellular ſubſtance, ſo connecting the diaphragm to the ribs, were marks of recent inflammation, which extended over a ſmall ſurface of the ſurrounding pleura: but it may be remarked, that the inveſting membrane of the thorax had in no other part been affected by the diſeaſe."

After obſerving that no diſeaſe was found either in the right ſide of the thorax, the heart, or its pericardium, Dr. Clarke makes the following obſervations on the caſe.

" Similar perforations of the diaphragm," ſays he, " with an intruſion of more or leſs of the abdominal viſcera into the cavity of the thorax, have been ſometimes found in children; but the patients have been ſoon deſtroyed after birth, by difficulty of reſpiration, from the lungs not being capable under ſuch circumſtances of being expanded. In theſe inſtances, the abdominal viſcera have been ſometimes found in the right, and ſometimes in the left ſide of the cheſt.

" My enquiries have not furniſhed me with any other inſtances of ſtrangulation, or even of perforation through the diaphragm.

" Several things in the hiſtory of this caſe, compared with the appearances after death, induce me to believe that the viſcera had been for a long time in this unuſual ſituation. The diminiſhed ſize of the lung of the left ſide, his occaſional coſtiveneſs for many years, the pain which he always felt from any preſſure on his belly, and the pain in his ſhoulder, all favour this opinion. The liver too was ſmaller and ſofter than is natural; and ſuch changes could not have taken place on a ſudden.

" Whilſt he lived regularly as to his meals, and the periſtaltic motion was not diſturbed, this unuſual ſtate of the viſcera produced no remarkable ſymptoms; but if at any time he ate a larger meal than ordinary, he was ſubject to coſtiveneſs, and to a pain which he always referred to the epigaſtric region. At ſuch times, it is probable that a larger quantity of fæces than uſual was forced into the protruded gut, and againſt the perforation through the diaphragm, by which their paſſage was for a time impeded.

" This cauſe appears to have laid the foundation of his death. He had eaten voraciouſly, and had accelerated the paſſage of the food by a purgative; by which means a ſtrangulation was brought on, ſo obſtinate as to reſiſt all the medicines employed for its removal.

" It is further to be obſerved, that (conſidering the nature of the diſeaſe) the ſymptoms were more mild than is uſual in caſes of fatal conſtipation from ſtrangulated hernia, introſuſception, &c.---and that, although the portion of inteſtine and epiploon found in the cavity of the thorax, and a large part of the contents of the abdomen, were in a high degree of inflammation, yet the cavity of the thorax partook but in a ſlight degree of the diſeaſe."

After Dr. Clarke's paper was read, he found that Ambroſe Paré had deſcribed a caſe in which the patient ſurvived a penetrating wound into the cheſt and through the diaphragm, for eight months, during which time he ſuffered great debility of the ſtomach, and pains, like colic, eſpecially in the evening. After one of theſe at-weeks he died, and his body was opened, when a large part of the colon was found to have paſſed through the wounded diaphragm into the thorax. In that caſe, the diſeaſe was evidently occaſioned by the wound; whilſt in that juſt related, there is every reaſon to believe that the perforation in the diaphragm had exiſted through the whole of the patient's life.

Dr. Clarke's caſe is illuſtrated by a drawing of the parts, for which we refer to the work itſelf.

Cyſtic hernia.—Hernia of the bladder of urine, though leſs frequent than that of the omentum or inteſtines, is not very uncommon. The ſituation in which it occurs is in the groin, through the abdominal ring, in the fore part of the thigh, under Poupart's ligament, ſo as to form inguinal or crural hernia. Inſtances have likewiſe occurred of the bladder being puſhed into the perinæum. Sometimes it occurs by itſelf, without any complication; at other times it is accompanied with inteſtines and omentum, both in inguinal and femoral herniæ: when complicated with bubonocele, the protruded part of the bladder is ſituated between the inteſtine and ſpermatic cord.

The uſual ſymptoms are a tumor attended with fluctuation, either in the groin, in the fore part of the thigh, or perinæum, which generally ſubſides when the patient voids urine. When the ſwelling is large, before water can be made with freedom, it is commonly neceſſary to have recourſe to preſſure, at the ſame time that the tumor, when in the groin or thigh, is as much elevated as poſſible; but when the ſwelling is ſmall, and eſpecially when no ſtricture is as yet produced, the patient generally makes water with great eaſe, and without any aſſiſtance from external preſſure. When the diſeaſe occurs without any complication, it is commonly owing to a ſuppreſſion of urine. In the diagnoſis, care ought to be taken not to miſtake it for a hydrocele. In recent caſes, the part protruding may in general be eaſily reduced, eſpecially if we attend to the ſuppreſſion of urine, which probably gave riſe to the diſeaſe. A proper truſs ought afterwards to be worn for a conſiderable time. When the diſeaſe has been of long ſtanding, adheſion takes place between the bladder and cellular ſubſtance of the ſcrotum. In this caſe, therefore, as long as no ſymptoms occur to render the operation neceſſary, a ſuſpenſory bandage ſo fitted as effectually to ſupport the prolapſed parts is the only probable means of relief.

Hernia vaginalis.—Sometimes the bladder, owing to a ſuppreſſion of urine, at other times part of the inteſtines, have been found to protrude through the vagina. In the former caſe, a fluctuation of water is perceptible to the touch.

The reduction is made by laying the patient on her back with her loins ſomewhat raiſed, and preſſing with the fore finger from the vagina. Deſcents may in future be generally prevented, by evacuating the urine often, and by the uſe of a peſſary introduced into the vagina. Nearly the ſame means are employed in reducing the inteſtine when it is found to protrude.

CHAP. XXIV. OF HYDROCELE.

EVERY tumor formed by a collection of water might with propriety be named *hydrocele*, but the chirurgical acceptation of the term implies a watery ſwelling ſituated in the ſcrotum or ſpermatic cord. Hydrocele is either anaſarcous or encyſted. In the former, the ſerum is chiefly diffuſed in the cellular ſubſtance: in the latter, the water is collected in a diſtinct bag. The ſcrotum with its contents are liable to both varieties of the diſeaſe; ſo is the ſpermatic cord with its coverings.

SECT. I. ANASARCOUS HYDROCELE *of the* SCROTUM.

As ſoon as water has collected in any conſiderable quantity in the ſcrotum, a ſoft, inelaſtic, colourleſs tumor is obſerved over the whole of it; impreſſions are eaſily received and obtained for ſome time; the ſkin at firſt preſerves its natural appearance, and the rugæ of the ſcrotum are not much altered; but as the ſwelling advances, they gradually diſappear, and are at laſt totally obliterated. The ſwelling, from being at firſt ſoft, and of a conſiſtence ſimilar to dough, by degrees turns more firm, and the ſkin at laſt acquires an unnatural white ſhining appearance. The tumor at length becomes large; and though originally confined to the ſcrotum, it at laſt ſpreads up the groin. The penis likewiſe becomes affected, and often ſo ſwelled and diſtorted as to excite much inconvenience and diſtreſs; and although the ſcrotum is compoſed of parts which readily admit of dilatation, the tumor ſometimes becomes ſo enormous that it burſts from one end to the other.

In the *ſurgical treatment* of this diſeaſe, punctures made with the point of a lancet are moſt adviſable; as large ſcarifications, in anaſarcous habits, are ſometimes apt to produce inflammation and mortification; while ſimple punctures readily heal, and can be renewed with very little pain as frequently as may be neceſſary: and beſides, punctures are equally uſeful with the inciſions; for as the cells of the ſcrotum communicate freely, if the punctures be made fairly through the ſkin, the water drains off very readily, though not ſo ſoon as by ſcarification. Previous to the operation, beſmearing the part with ſome tough ointment of an innocent nature, and afterwards keeping it as dry as poſſible by a frequent renewal of dry ſoft linen cloths, in order to imbibe the moiſture, is here a neceſſary piece of attention. The want of this ſeems to be the cauſe of much of the miſchief which frequently enſues from operations of this kind. When ſcarifications or punctures go wrong by beginning to inflame and turn painful, &c. a cold ſolution of ſaccharum ſaturni, applied upon ſoft linen, proves moſt effectual in putting a ſtop to the further progreſs of the inflammation, and affords moſt immediate relief to the patient in the preſent diſtreſs. Lime-water, employed in the ſame manner, proves alſo a very uſeful application. When, however, the diſorder proceeds to gain ground by a real mortification coming on, we ſhould immediately have recourſe to bark and other medicines uſually employed in ſuch affections.

Although the anaſarcous hydrocele, for the moſt part, depends upon a general dropſical tendency, ſome inſtances occur of a *local cauſe* producing a mere local dropſy of the ſcrotum. Thus, it has been known to happen from ſwellings in the groin and in the abdomen obſtructing the paſſage of the lymphatics. When this is the caſe, if tumors producing ſuch obſtructions can be extirpated, no other means will afford ſuch effectual relief; but when they are ſo deeply ſeated as to render any attempt for removing them improper, the practice we have already pointed out of making punctures in the moſt depending part of the tumor muſt be employed with a view to palliate ſuch ſymptoms as occur. It ſometimes happens in ſuppreſſion of urine, whether ariſing from ſtrictures in the urethra or from ſtones impacted in it, that the urethra burſts, and the urine in this manner getting acceſs to the cellular texture of the ſcrotum, an anaſarcous ſwelling riſes immediately over the whole of it; nor does it commonly diminiſh till the cauſe by which it is produced is removed. In order to prevent the formation of ſinuſes, which in ſuch circumſtances will otherwiſe be apt to occur, an inciſion ſhould be made into the tumor, and carried to ſuch a depth as is ſufficient for reaching the wound in the urethra. In this manner a free vent will not only be given to the urine already diffuſed, but the further collection of it may probably be prevented. If a ſtone impacted in the urethra be found to be the cauſe of effuſion, it ſhould be cut out; and if the obſtruction be produced by ſtrictures in the urethra, they muſt be removed by a proper uſe of bougies. The cauſe being thus removed, if the habit of body of the patient is good, and untainted with any venereal or other general affection, by dreſſing the ſore properly with ſoft eaſy applications, the opening into the urethra will probably heal, and a complete cure will in this manner be obtained. But when theſe ailments are complicated with any general affection, particularly with old venereal complaints, it frequently happens that neither mercury nor any other medicine has much influence in removing them.

SECT. II. HYDROCELE *of the* TUNICA VAGINALIS TESTIS.

In the healthy ſtate of the body, a ſmall quantity of aqueous fluid is exhaled for lubricating the ſurface of the teſticle, the ſuperfluous part of which is abſorbed by veſſels appointed for that purpoſe. When the ſecretion of this fluid is either morbidly increaſed, or its abſorption diminiſhed, a preternatural collection of water is formed in the cavity of the vaginal coat, and hydrocele of the vaginal coat produced.

Symptoms.] The ſymptoms are, a fullneſs at firſt obſerved about the inferior parts of the teſticle, and moſt remarkable when the patient is erect, becoming gradually more tenſe as the diſeaſe advances: the tumor by degrees changing from the globular to the pyramidical form; no degree of preſſure making the ſwelling diſappear at any period of the diſeaſe. In the early part of the diſeaſe therefore, if it be not combined with hernia, or with a hydrocele of the cord, the ſpermatic proceſs may be diſtinctly felt, becauſe the ſwelling does not extend beyond the ſcrotum. In its more advanced ſtate, it cannot be diſtinguiſhed: the weight of the tumor now drags the ſkin of the neighbouring parts ſo much as to cauſe the penis almoſt to diſappear; and in this ſtate of the diſeaſe the teſticle cannot be felt without much difficulty. On a minute examination, a hardneſs is always to be felt along that part of the ſcrotum where the teſticle is ſituated; and at this point preſſure excites ſome uneaſineſs. Fluctuation of a fluid may in general be diſtinguiſhed through the whole courſe of the diſeaſe. In late ſtages, however, the appearance of a fluid is not very evident.

The tranſparency of the tumor has been generally ſuppoſed to be the principal criterion of this ſpecies of the diſorder; but this muſt depend upon the nature of the contents, or thickneſs of the ſac; ſo that, though the tranſparency of the tumor is a certain ſign of the exiſtence of water, its opacity cannot upon any account be conſidered as an indication of its abſence. Through the whole courſe of the diſeaſe the tumor is not attended with pain, but ſome uneaſineſs is commonly felt in the back by the weight of the ſwelling of the ſpermatic cord. This is more particularly the caſe when a ſuſpenſory bandage is not uſed.

Treatment.] In the radical cure of hydrocele, in whatever way it is attempted, ſome degree of fever and inflammation will take place. Under the circumſtances mentioned in the prognoſis, the operation, if properly performed, is generally attended with the moſt complete ſucceſs. But if the patient be very old, infirm, and diſeaſed, an operation may be attended with ſuch a degree of inflammation, and conſequent ſuppuration, as to be in danger of deſtroying a conſtitution already greatly impaired, and therefore ought not to be performed.

Various methods have been propoſed for the cure of hydrocele, all of which may be reduced to two general heads: ſuch as have in view only a temporary relief, and which is therefore termed the palliative cure; and ſuch as are meant to effect a radical cure. When the tumor has become ſo large as to be inconvenient from its ſize, an evacuation of the water by ſurgical means becomes neceſſary. In this caſe, if the patient either refuſes to ſubmit to the operation for a radical cure, or if his ſtate of health render that operation improper, the palliative treatment, or a mere evacuation of the water by puncture, is the only means which can be employed.

Palliative cure.] A lancet-pointed trocar was many years ago recommended for drawing off the water in this manner by the preſent Dr. Monro; and ſince that time it has in an improved ſtate (fig. 61, Plate II.) been recommended by Mr. Andree; another (fig. 62) has been propoſed by Mr. Bell. With any of theſe an opening may be made into the tunica vaginalis with ſafety.

The operator with one hand ſhould graſp the tumor behind, to preſs the contained fluid to the anterior and under part of it. If a round trocar is to be uſed, a puncture with a lancet ſhould be made where the trocar is to enter; but where a flat trocar is to be employed, the aſſiſtance of the lancet is unneceſſary.

As ſoon as the inſtrument has pierced the vaginal coat, the ſtilette ſhould be withdrawn, and the canula left in the ciſt. The water will now run off; and if the tumor be not uncommonly large, it may be all drawn off at once; but as the ſudden diſcharge of it, by taking off the ſupport, might be in danger of rupturing ſome of the veſſels, it ſhould be diſcharged by ſlow degrees. When the whole is evacuated, a piece of adheſive plaſter ſhould be immediately applied to the orifice; and a compreſs of ſoft linen being laid over the ſcrotum, the whole ſhould be firmly ſupported with a ſuſpenſory bag or a T bandage. The patient, in this ſtate, being laid in bed, all kind of uneaſineſs is in a few minutes commonly gone, and he is able to follow his ordinary buſineſs without interruption.

Radical cure.] The intention of every means now in uſe for the radical cure of this ſpecies of the diſeaſe, is to induce ſuch a degree of inflammation on the parts in which it is ſeated as may obliterate entirely the cavity of the tunica vaginalis, by making it adhere to the ſurface of the teſticle. The means at preſent generally employed for effecting a cure are, exciſion of the tunica vaginalis; the application of cauſtic; the uſe of a ſeton; a ſimple inciſion of the ſac; and the injection of acrid liquors into the tunica vaginalis, after drawing off the fluid which it contained. The method of cure, by the *removal of the vaginal coat*, is, firſt to lay open the vaginal coat, and then to cut it away by different ſnips of a pair of ſciſſars. The ſac being removed, the parts are to be dreſſed and treated in the ſame manner as in the operation where ſimple inciſion is uſed.

By cauſtic.] The cure by cauſtic is attempted in the following manner. The ſcrotum being ſhaved, a piece of common paſte cauſtic, properly ſecured with adheſive plaſter, is applied of about a finger's breadth, the whole length of the tumor; and if, on removing the cauſtic, it has not penetrated into the vaginal coat, an opening is made in it with a ſcalpel, ſo as to evacuate the contents, lay bare the teſticle, and admit of proper dreſſings. But Mr. Elſe, one of the lateſt writers in favour of the method of cure by cauſtic, ſays that there is no neceſſity for ſuch an extenſive application of cauſtic as many have recommended; that an eſchar of the ſize of a ſhilling is ſufficient; that this may be always fully obtained by the application of cauſtic paſte of the ſize of a ſixpence, which is to be laid on the anterior and under part of the ſcrotum, and to be properly ſecured by plaſter, in order to prevent it from ſpreading. The cauſtic commonly produces all its effects in five or ſix hours, and may then be removed. At this time digeſtives, or an emollient poultice, muſt be applied over the ſcrotum, and the whole ſuſpended with a bandage. Inflammation, Mr. Elſe obſerves, is ſoon induced over the whole tunica vaginalis; and the febrile ſymptoms which ſucceed, he adviſes to be kept moderate by blood-letting, injections, emollient poultices, and a low regimen. In a few days the eſchar of the ſcrotum ſeparates, and comes away; and in a gradual manner, in the courſe of four, five, or ſix weeks, the whole tunica vaginalis adheres, when the wound for the moſt part ſoon heals, and a complete cure is obtained.

By ſeton.] Where it is intended to treat hydrocele by means of a ſeton, it may be done in the following manner: an opening is made with a ſcalpel, or the ſharp-pointed biſtoury, in the ſuperior part of the tumor, large enough to admit with eaſe a thick cord of common white ſewing ſilk. A director, with an eye at one end, in which the cord is inſerted, is introduced at this opening; and its further extremity being carried down to the moſt depending part ot the tumor, an opening is there made, of about half an inch in length, by cutting upon the director with the biſtoury; the director being now drawn till a ſufficient quantity of ſilk is left hanging out below, the operation is in this manner finiſhed.

Another very ſimple method of introducing a ſeton is by means of a ſilver canula and perforator, as propoſed by Mr. Pott.

By inciſion.] In the operation for a radical cure by inciſion, the patient being laid upon a table of convenient height, and properly ſecured by aſſiſtants, with the ſcrotum lying nearly on the edge of the table, the operator with one hand ſhould graſp the tumor behind, ſo as to keep it firm and make it ſomewhat tenſe anteriorly: with a common round-edged ſcalpel in the other hand, he ſhould now divide the external integuments by one continued inciſion from the upper to the under end of the tumor. An opening is next to be made in the vaginal coat with a large lancet, or a ſharp-pointed biſtoury at the upper end of the firſt inciſion. This opening ſhould be made of ſuch a ſize as freely to receive the finger of the operator, which is to conduct a blunt-pointed biſtoury, ſo as to divide the ſac down to its bottom, which is conſidered as being of advantage, by preventing partial adheſions, and the riſk of a return of the diſeaſe.

The inciſion being completed, the teſticle is now brought fully into view; and if the tunica vaginalis be ſound, the dreſſing may be finiſhed immediately. But if the ſac be diſeaſed, it is to be removed, which may be readily accompliſhed by a ſcalpel or biſtoury.

When the hydrocele, as ſometimes happens, affects both ſides at the ſame time, if, when the operation is done on one ſide, an opening be made into the vaginal coat of the oppoſite ſide, at the upper part, through the ſeptum ſcroti, and the inciſion carried down to the bottom of the tumor, the ciſt can be equally well laid open, the water is completely evacuated, and a return of the diſeaſe as much prevented, as when the operation is done in the uſual manner, and at different times.

In whichever way the inciſion is made, if the teſticle be ſound, the wound ought to be quickly dreſſed; for it is found, that on this much of the ſucceſs of the operation depends. For if the vaginal coat be merely applied to the teſticle, or united by ſutures, as ſome have adviſed, partial adheſions are apt to take place, before a degree of inflammation is produced over the whole, ſufficient for making a complete cure. In this manner cavities are left, which either fill with pus during the cure, and require to be laid open, or they afterwards give riſe to collections of water, and thereby occaſion a return of the diſeaſe. The practice of ſtuffing the cavity of the ſore with dreſſings is alſo a frequent cauſe of miſchief, by exciting too great a degree of inflammation in the part. But when the dreſſings are properly managed, ſymptoms of violence almoſt never occur. The lateſt authors adviſe, that in dreſſing the parts after the operation, two pieces of lint or old ſoft linen are to be dipped in oil, or in a liniment of wax and oil, and then, by the help of a probe, are to be inſerted into the bottom of the ſac on each ſide of the teſticle, leaving a ſufficient quantity of the pledgets hanging out of the wound, ſo as to admit of being eaſily withdrawn at the firſt or ſecond dreſſing. The edges of the wound are next to be dreſſed with pledgets of cerate, and the ends of the oiled pledgets turned over on each ſide. Several pieces of ſoft lint are then to be laid over the wound, and theſe ſhould be more or leſs numerous in proportion to the heat of the ſeaſon. A compreſs of linen is now be laid over the whole, and the dreſſings ſupported by a T bandage or ſuſpenſory bag properly fitted. The patient is then to be carried to bed; an anodyne ſhould be given, eſpecially if there ſhould be much pain; and he ought to be adviſed to lie as much as poſſible upon his back for a few days after the operation.

In the third or fourth day after the operation, all the dreſſings, except thoſe between the teſticle and tunica vaginalis, are to be removed; and if this cannot be done readily, as the parts are otherwiſe apt to become uneaſy, a ſponge dipped in warm water ſhould be applied. On ſome occaſions, at the firſt dreſſing, and always at the ſecond or third, the pledgets inſerted between the tunica vaginalis come away; and whenever this happens, they ſhould be renewed. It is alſo proper to renew them daily for the firſt fourteen or fifteen days after the operation; not however of the ſame depth as the firſt, for during the latter part of the cure they need only to be inſerted as far as to prevent the divided edges of the tunica vaginalis from adhering to the teſticle, before the adheſive proceſs has taken place in the parts more deeply ſeated. Particular attention however is neceſſary to this part of the treatment; for when the diſeaſe returns, it has been found to be chiefly owing to the edges of the vaginal coat being allowed to adhere to the teſticle, before adheſion had taken place between the deeper ſeated parts.

A complete adheſion of the two coats of the teſticle, the tunica vaginalis, and tunica albuginea, takes place moſt frequently about the third week after the operation. Previous to this time, inflammation continuing gradually to increaſe, the tumor becomes larger till it acquires ſomewhat of the ſize of a ſwelled teſticle from gonorrhœa; but after this period it gradually ſubſides, and the ſore produced by the inciſion, and now reduced to a line, heals in ſome time between the fourth and eighth week, according to the habit of body, age of the patient, and other circumſtances.

Having thus given an account of the methods uſually employed in the cure of hydrocele, we ſhall now make a few obſervations on the *comparative advantages* of the three laſt. From the teſtimony of many authors of credit, it is evident, that any of theſe methods, in moſt inſtances, prove effectual; but every practitioner being apt to be prejudiced in favour of a particular method, he generally continues to follow that mode and no other; and finding it commonly ſucceed, he by degrees perſuades himſelf, that other methods of cure, with which he has not had ſuch opportunities of becoming acquainted, are liable to objections, which thoſe who have practiſed them do not find to be the caſe. The reſult of Mr. B. Bell's obſervations upon this ſubject is, that although all the three modes of operating, by cauſtic, the ſeton, and ſimple inciſion, are perhaps equally capable of producing a radical cure; yet, that of the three, the latter, viz. the mode by the ſimple inciſion, is liable to feweſt objections, and effects a cure, both with leaſt trouble to the operator and leaſt riſk to the patient: and of the other two, the treatment by cauſtic appears to be the beſt. He has ſeen all the three produce troubleſome ſymptoms, ſuch as pain, and tenſion of the abdomen, inflammation, and fever; but heſitates not to ſay, that the ſeton is more frequently productive of theſe effects than any of the other methods.

Mr. Latta is a decided friend to the cure by inciſion, which he particularly deſcribes in vol. ii. of his valuable Syſtem of Surgery, p. 327.

"The following caſes," ſays he, "will evince the propriety of the mode of operating above recommended, and likewiſe ſhew that, not unfrequently, a radical cure may be effected by a ſimple inciſion of about an inch and a half in length in the moſt dependent part of the ſcrotum, without any lint being put into the cavity of the vaginal coat, but only by a free admiſſion of external air into it.

Case I. "J. M. aged about fifty-four, had been affected with an hydrocele on the left ſide of the ſcrotum for about three years. It had begun on the under part, proceeding gradually upward, and was tranſparent. The operation was performed by laying him on a table three feet and a half high, and making an inciſion from the top to the very bottom of the tumor, and even a little backwards, at one ſtroke of the ſcalpel. I then made an opening with an abſceſs lancet into the tumefied vaginal coat, about its middle, large enough to admit the point of the fore-finger of my left-hand. Upon this I introduced the ſtraight probe-pointed knife, and laid open the vaginal coat to the uppermoſt extremity. Then turning my finger downwards, I with the ſame knife laid open the tunic to the bottom. The teſticle appeared quite ſound, and a piece of caddice dipped in fine oil was put into the vaginal coat, as above directed, from one end of the tumor to the other; the ſides of the ſac were brought together upon this dreſſing, and the edges of the wound dreſſed with pledgets of cerate, and the whole covered with caddice, and a ſmall compreſs of lint, a T bandage being put over all.

"Though the whole of this operation was finiſhed in leſs than five minutes, and nothing ſeemed to be amiſs in the conſtitution of the patient, the event nevertheleſs proved fatal. After being put to bed, he had an anodyne, but ſlept not a moment all that night. Next day at twelve o'clock his pulſe beat fifty-ſix in a minute, and as he had no complaint, nothing was ordered. Exactly thirty-ſix hours from the operation, he was attacked with laborious breathing, accompanied with great anxiety, as he ſaid, about his heart, his pulſe up to 120, and very feeble. No reaſon could be aſſigned for this extraordinary change; but, on making enquiry of the nurſe, I found that he had ſlept none for ſix days and nights paſt, owing merely to the terror he was in for the operation, by which he expected nothing leſs than to be diſſected alive. This had been put in his head by ſome fooliſh people in the Highlands, from whence he came; I then recollected ſome expreſſions made uſe of by him after the operation was over, which confirmed the accounts of the nurſe; that on finding he had got ſo eaſily over it, he had appeared quite tranſported with joy. From the time that I ſaw him, the anxiety conſtantly increaſed; in two hours his pulſe, which at firſt was 120, became ſo quick, that it ſeemed to be one continued undulation; and in two hours more he expired. The death of this patient was ſo unexpected, that I can ſcarce account for it, otherwiſe than by the ſudden tranſition from fear to exceſſive joy, which he was unable to bear.

CASE II. "Mr. J. G. aged ſixty, whom I found labouring under a ſwelling of the right ſide of the ſcrotum, ſo large that not a veſtige of the penis was to be ſeen. The cord was found in its natural ſtate; and he informed me that the ſwelling began at the bottom of the ſcrotum, gradually aſcending, and increaſing both in ſize and weight till the preſent time. He being unwilling at that time to undergo the operation for a radical cure, I contented myſelf with making a puncture in the moſt depending part of the tumor, by which ſix pounds of fluid were evacuated; the orifice being covered with a little caddice, and a pledget of ſimple cerate, the ſcrotum being ſupported by a proper ſuſpenſory bag. In two days the orifice was well, and the ſcrotum contracted to near its natural ſize; but the water ſoon began to collect again, and in about nine months I was ſent for, and found the tumor near half the ſize of the former, but with this difference, that the ſwelling was puſhed up towards the ring, and gave him much pain as it increaſed, particularly when he attempted to bend forward in the leaſt. He now conſented to ſubmit to an operation. As he was of a robuſt conſtitution, and the complaint had been brought on by a bruiſe on the teſticle upon mounting his horſe, I determined to purge him freely. I therefore ordered him an electuary of cryſtals of tartar for two days ſucceſſively, and on the third performed the operation, by laying the patient acroſs the bed, with his breech exactly to the edge of it, ſo that his feet reſted on the floor. His thighs being thus extended, and held faſt by an aſſiſtant on each ſide, I laid hold of the back part of the ſcrotum with my left hand, graſping it ſo tight as juſt to make the ſkin tenſe on the oppoſite ſide; after which I made an inciſion, from the upper part of the ſwelling to the very bottom of the ſcrotum, with a round-edged ſcalpel, through the ſkin. Near the ring, and for two inches lower down, I found the vaginal coat covered only by the ſkin and the cellular membrane in the uſual way; but, below this, to the very bottom of the ſcrotum, nearly four inches more in length, I found the latter thickened to no leſs than half an inch before the vaginal coat could be diſcovered, at the ſame time that the conſiſtence of it was more ſolid than even muſcular fleſh; ſo that, in this under part, repeated ſtrokes of the ſcalpel were required to cut through it. An abſceſs lancet was then introduced into the upper and moſt prominent part of the ſwelling, ſo as to admit the complete introduction of the finger of my left hand. Upon it I next introduced the probe-pointed knife, laying open the vaginal coat upwards to nearly its extremity, and turning it downwards, did the ſame thing. Here, however, as in the ſcrotum, I alſo found the under part of the vaginal coat remarkably thickened; and, as the edges of it ſtuck out conſiderably after the retraction of the ſkin, I diſſected way nearly three quarters of an inch in breadth of each ſide of the thickened part. The teſticle being perfectly ſound, I laid one fold of caddice, dipt in oil, within the vaginal coat on the ſide oppoſite to the teſticle, from nearly the upper end to the lowermoſt part of it, leaving a part of the caddice here, as well as in every other part to which it reached, ſticking out of the wound. The ſides of the wound were then brought together, and dreſſed with pledgets of ſimple cerate; the whole of the wound being afterwards covered with caddice, over which was put a ſmall bonnet of tow, with a compreſs of linen above it, and the whole ſecured by a T bandage.

" The patient was now put to bed, and had an anodyne draught, with thirty drops of laudanum. In five days the dreſſings were removed; but the caddice introduced into the bottom of the ſac ſtill remained firm, the ſcrotum being much ſwelled and uneaſy. A large emollient poultice was applied, and changed twice every twenty-four hours. He was now almoſt free from every complaint, except what aroſe from the uneaſineſs of the wound; and in ten days the ſcrotum began to ſuppurate freely, the pain, ſwelling, and tenſion daily diminiſhing, but the caddice ſtill remaining firm towards the bottom. He was now allowed his uſual diet, and the poultice was removed, the uſual dreſſings of the wound being continued. The caddice was entirely thrown out in eighteen days from the performance of the operation, the ſcrotum much reduced in ſize, and the wound diſcharging freely. The uſual dreſſings were continued; and, in ſeven weeks from the operation, the cure was completed, the wound being entirely healed, and the ſcrotum reduced almoſt to its natural ſize; and at this moment is in good health, never having had the ſmalleſt return.

Case III. " A man of thirty-ſix years of age, complained of a hydrocele of the tunica vaginalis. As he was quite healthy, and the cord in a ſound ſtate, the operation was immediately determined upon, without preſcribing any thing elſe than a gentle doſe of phyſic. The operation was performed by making an inciſion through the ſkin and cellular ſubſtance as above directed, and opening the vaginal coat, near the middle, with a lancet, ſo that the fore-finger of the left hand could be introduced, and thus the vaginal coat laid open, both above and below, to both its extremities, as mentioned in the preceding caſes. Caddice dipped in oil was then introduced, as already mentioned, and the lips of the wound brought together with part of the caddice ſticking out. The wounds were dreſſed with ſtraps ſpread thick with calamine cerate, and the dreſſing finiſhed and kept on as in former caſes; the whole being finiſhed in the ſpace of five minutes.

" The patient being now put to bed, had a draught with thirty drops of laudanum. Two days after the operation, he complained of conſiderable pain in his ſcrotum, riſing upwards to the belly, and ſpreading to the ſmall of his back. His pulſe full and ſtrong, beating 100 in a minute, the ſkin rather hot, belly coſtive, with a ſlight head-ach, and thirſt. Having loſt very little or no blood during the operation, ten ounces were now taken from his arm, a gentle laxative injection given at bed-time, and a large poultice of bread and milk applied to the ſcrotum, after removing as many of the dreſsings as would eaſily come away. Next day (Oct. 17th), the pain ſhooting to his back, was much relieved ſince the blooding and injection, the latter having operated well. The poultice was again applied; and, as he had ſlept but little laſt night, an anodyne with thirty drops of laudanum was given at bed-time.

" 18th, On removing the poultice, all the dreſſings came away at once, but no purulent diſcharge followed, though the wound looked tolerably. The pains ſhooting to the back were conſiderably relieved, but the ſcrotum continued much ſwelled, and very painful. Ten ounces of the infuſion of tamarinds, with a double quantity of ſenna, were ordered to be taken at twice in the morning, an hour between each doſe; the poultice continued.

" 19th, Phyſic had operated well, with great relief every way; the wound beginning to diſcharge pretty copiouſly; poultice continued.

" 24th, The dreſſings within the vaginal coat came away this day, along with a pretty copious diſcharge of thin matter; the ſides of the ſcrotum were preſſed cloſe together, and the edges of the wound drawn towards each other by ſtraps ſpread with gently adheſive plaſter, to within an inch and a half of the under extremity of the opening; the whole being then covered with caddice, and the dreſſings kept on by a T bandage as directed. He was now allowed animal food every day at dinner, with a bottle of London porter, two glaſſes of wine, or a little ſpirits and water, with his uſual food for breakfaſt and dinner. The wound was dreſſed regularly every day for five weeks; at the end of which time it was completely ſkinned over, though the ſcrotum continued more full on that than the other ſide. This fulneſs continued for ſeveral weeks, but entirely ſubſided, and ſince that time he has never had a complaint.

Case IV. " M. G. had been affected with an hydrocele of the tunica vaginalis, for which he had been punctured in the ſummer of 1783, and nearly ſix pounds of water drawn off from the right ſide. In three months after the operation, the water began again to collect; and, in March, 1784, he came to Edinburgh with a deſign to undergo the operation for a radical cure. It was accordingly performed in the uſual manner; but on laying open the vaginal coat, as in the preceding caſes, all the ſides of it were found full of water in cells reſembling ſmall hydatids, every one of which I was obliged to lay open by repeated ſtrokes of the ſcalpel. The teſticle was completely ſound; but, as the vaginal coat had not only been long expoſed to the air, but likewiſe to the preſſure of a warm ſponge, the ſides of it were brought immediately into contact with each other, as well as the teſticle. The edges of the wound being brought immediately into contact, the parts were retained in this poſition by adheſive plaſters, which in a great meaſure were made to ſurround, and gently to preſs the whole of the diſeaſed ſide of the ſcrotum together.

"The wound being dreſſed, and the uſual means for keeping on the dreſſings applied, the patient was put to bed, and an anodyne given at night. He ſlept tolerably well, and next morning was quite free from pain, the pulſe natural, appetite good; but was confined to a low diet for a day or two. In three days from the operation he began to complain of a ſlight pain, attended with a conſiderable degree of heat in the affected ſide. His belly being coſtive, he was ordered an injection of a pound of warm water; the dreſſings, which would eaſily come away, were removed, and a large poultice of the crumb of bread, and a ſolution of ſugar of lead (made with three drachms of the latter, two ounces of vinegar, and thirty of water), applied all over the parts, and ordered to be renewed thrice a-day.

"Fourth day from the operation, pains greatly relieved; the injection had operated well; poultice to be continued; and, in the morning, to have four ounces of the infuſion of tamarinds with ſenna every hour till it operated.

"5th, Has had three copious ſtools. On removing the poultice, the ſtraps came away along with it; the pain of the ſcrotum gone, though a conſiderable tenſion and ſwelling of the parts ſtill continue; the ſides of the wound ſeem in many places to have coaleſced. The ſtraps were applied again, and the poultice over them. Having now no complaint, and his appetite being good, he was allowed to dine upon any kind of ſolid food he choſe, only cautioned againſt eating much at once; and, having been accuſtomed to take a glaſs of wine rather freely after dinner, he was now indulged with four glaſſes daily at that time.

"8th, Swelling and tenſion of the ſcrotum greatly diminiſhed, without any pain, excepting when roughly handled. Sides of the wound ſeem to adhere completely, except for about an inch near the bottom of the ſcrotum; the parts were ſtill ſupported by the application of the ſtraps; but as the poultice was now become troubleſome, it was taken away, and the nurſe taught to apply a piece of flannel moiſtened in the above-mentioned ſolution, for an hour, three times a-day, covering up the parts during the intervals with caddice, in a proper ſuſpenſory.

"14th, The wound ſeemed completely healed; and though there was a conſiderable thickneſs over the whole ſurface of the teſticle, not the leaſt ſoftneſs or tendency to fluctuation could be perceived in it. In two weeks more the patient ſeemed completely cured, and went to the country. It is now nine years ſince, and he has never had the ſmalleſt return.

Case V. "P. R. aged forty, had for two years been afflicted with a hydrocele vaginalis. He readily conſented to undergo the operation; and, as the ſpermatic cord was ſound, and the patient otherwiſe healthful, it was immediately performed by laying open the vaginal coat in the manner already directed. About two pounds of a coffee-coloured liquor were drawn off, the teſticle appearing flaccid, and of a ſize ſmaller than natural. A piece of caddice moiſtened in oil was then introduced as directed, the lips of the wound brought together, and the edges of it dreſſed with ſimple cerate.

" In five days after the operation, the whole of the external dreſſings were removed. Scrotum much ſwelled; lips of the wound thick and flabby; dreſſings inſerted within ſtill firm; pulſe about 100; belly coſtive. Had an injection of twelve ounces of warm water, and two ounces of oil. Had alſo a large emollient poultice applied to the ſcrotum for two days longer, night and morning, when the whole of the external dreſſing came away eaſily. The ſize of the ſcrotum from the free diſcharge of matter that had taken place was much diminiſhed; and the pulſe now beat only eighty-ſix ſtrokes in a minute. Was ordered eight ounces of the ſimple infuſion of tamarinds and ſenna to be taken on the eighth morning after the operation, and the wound to be dreſſed ſuperficially, bringing it together by adheſive ſtraps. On the twelfth day from the operation, wound looking remarkably well; ſwelling much diminiſhed, as well as the diſcharge; was dreſſed as before. But the edges of the wound were now completely brought into contact, from the uppermoſt part of the inciſion to the bottom; and the patient was now ordered animal food for dinner, and a glaſs or two of port wine regularly after it. Having now almoſt no complaint but weakneſs, no medicine was further neceſſary. He was dreſſed regularly every day as above mentioned. In twenty-ſix days from the operation's being performed, the edges of the wound adhered accurately; and except a very ſmall degree of fulneſs, without the leaſt fluctuation, nothing elſe remained. The parts were ordered to be conſtantly ſuſpended in a ſuſpenſory bag, till the whole of the fulneſs ſhould be removed. And, although near five years ſince the operation was performed, he has not at this moment the ſmalleſt degree of ſwelling or uneaſineſs in the part.

Case VI. " A. M. twenty-eight years of age, complained of a large tenſe and oval ſwelling on each ſide of the ſcrotum, but larger by one-third on the right than on the left ſide. They had begun about two years before, after conſiderable fatigue and expoſure to cold. Both felt remarkably tenſe, and gave an evident ſenſation of fluctuation to the finger when properly applied, As the patient was healthy, I propoſed to operate upon both ſides at the ſame time, which was accordingly done on the 10th of this month, by making an inciſion through the ſkin and cellular ſubſtance the whole length of the tumor on the right ſide, and laying open the vaginal coat, as directed, from one end to the other. I then cautiouſly ſcratched a hole in the ſeptum ſcroti, upon which the water flowed out from the left vaginal coat; and I next introduced my finger through the opening, and dilated it to the very bottom; after which a ſmall piece of caddice, about four inches in length, and one in breadth, dipped in oil, was thruſt into the left vaginal coat, the inferior end of it being left about half an inch without the lips of the wound at the bottom. The right ſide was dreſſed from the bottom with a piece of caddice dipped in oil as directed, and the wound dreſſed in the uſual manner. After the patient was put to bed, he had an anodyne draught, with thirty drops of laudanum, to be repeated at bed-time, if there ſhould be occaſion.

" 11th, Has had a good night, with no great pain, but complained of an uncommon heat, with ſlight tenſion in the wounded parts. Pulſe ninety-ſix and ſharp; ſkin hot; was blooded to ten ounces; had a large watery clyſter in the afternoon, and a draught was ordered at night.

" 12th, The injection had operated freely; the blood taken away was covered with a buff-coloured coat; pulſe eighty-four, and much ſofter; heat and tenſion of the ſcrotum abated; has had a tolerable night. Injection and draught to be repeated.

" 13th, Slept well, and is now much eaſier in every reſpect. As many of the dreſſings to be removed as will eaſily come away; and a large emollient poultice to be applied all over the ſcrotum at bed-time, and renewed in the morning.

" 14th, Dreſſings came away on removing the poultice; the lips of the wound thick and flabby, without any purulent diſcharge. Conſiderable pain and tumor in the ſcrotum from being much handled. A piece of dry caddice was now put over the wound, and the whole covered with an emollient poultice, to be renewed thrice a-day; a watery clyſter had been given every ſecond night ſince the operation, with an electuary of an ounce and a half of cryſtals of tartar mixed up with ſyrup, of which he was to take a tea-ſpoonful every morning until it operated.

" 18th, Wound diſcharged freely; ſwelling and pain conſiderably abated; the dreſſings within the ſcrotum ſtill continuing firm; the poultice was continued; but, as the patient was perfectly free from fever, he was now allowed a little animal food for dinner, with half a bottle of porter daily.

" 22d, Pain and inflammation much leſſened; the dreſſings of the right-ſide came away this day with great eaſe, but thoſe of the left ſtill remained firm. Poultice now being removed; ſides of the wound kept cloſe together, and its edges dreſſed with ſtraps ſpread with ſimple cerate and caddice as directed, and kept on in the uſual manner.

"26th, A copious diſcharge of excellent pus; the internal dreſſing of the left vaginal coat removed to-day with ſome little difficulty, having contracted an adheſion at the upper end. Its removal was followed by the diſcharge of about two ounces of thin watery fluid, mixed with a little blood and purulent matter, wound beginning to heal from the upper part as well as from the bottom. Dreſſed as uſual.

"March 4th, Swelling and tenſion ſtill diminiſhing; wound diſcharging freely; about half of the ſurface of the right teſticle expoſed to view by reaſon of the retraction of the lips of the wound. Attempted to bring together the gaping lips by adheſive ſtraps. Dreſſed as uſual.

"10th, Swelling and tenſion of the ſcrotum almoſt completely gone; wound healed, except at the part where a little portion of the teſticle is ſtill bare. Dreſſed with ſimple cerate and a little caddice as uſual.

"April 1ſt, Wound nearly cicatrized; pain and ſwelling entirely gone; the patient has been going about for the two laſt weeks without the leaſt inconvenience.

Case VII. "W. R. aged ſixty, was afflicted with a ſwelling of the left ſide of the ſcrotum ten inches long, and nearly eight in circumference, which had begun ſome years before after a fever, and had aſcended gradually from the bottom of the ſcrotum. The tumor was opaque, but by its fluctuation and other ſigns, evidently ſhewed itſelf to be a dropſy of the tunica vaginalis. The ſize of the tumor, as well as the delicacy of the patient's conſtitution, in this caſe, induced me to propoſe to let off the water by puncture, rather than to perform the operation for a radical cure. This was immediately done by means of a trocar, and about a pound and a half of a greeniſh fluid drawn off, when the diſcharge was interrupted, and could not be renewed by the introduction of a probe. The trocar was therefore removed, and a grooved directory introduced through the opening, which was now dilated to the length of an inch and a half, through which a great quantity of hydatids, ſome of them of a large ſize, filled with a liquid of the ſame kind with that which had been evacuated, came out to the amount of about ſix pounds weight in all. The whole of theſe, as well as the water, being evacuated, I introduced a piece of caddice within the opening for about two inches and a half in length, leaving nearly about the ſame length hanging out of the wound. As the puncture had been originally made in the moſt depending part of the tumor, no water could be retained in the inſide of the vaginal coat. The wound was now dreſſed in the uſual manner, the ſcrotum ſupported by a T bandage, and the patient put to bed. He had become faintiſh from the quantity of water diſcharged, but recovered on being put to bed, and taking a little ſpirits and water. At night he had an anodyne draught, and reſted well. Next morning he had no complaint; but in four days after began to complain of pain and uneaſineſs, with a degree of heat in the ſcrotum. On removing the dreſſings, the vaginal coat was found conſiderably indurated throughout its whole length, and painful to the touch, being alſo much ſwelled towards the lower part, the integuments moreover being much inflamed, and the internal dreſſings remaining firm. An emollient poultice was ordered to the ſcrotum, to be renewed thrice a-day. He was likewiſe ordered twelve ounces of the infuſion of tamarinds and ſenna, of which he was to take a wine-glaſsful every hour in the morning until it operated. By this he had two copious ſtools, which afforded great relief; the internal dreſſings were removed, and nearly four ounces of a very high-coloured fluid diſcharged. A piece of caddice was now again introduced into the vaginal coat through the lips of the wound, and dreſſed as formerly, with a poultice over it. The diſcharge of high-coloured fluid mixed with a little matter from the wound, continued to be conſiderable for ten days; but, during this time, the pain and ſwelling greatly diminiſhed. The opening, however, was ſtill kept ſlightly filled with caddice as before, and I determined to keep the wound open as long as any thing was diſcharged. In eight weeks from the operation, the wound was completely healed up, and the whole of the vaginal coat and ſcrotum contracted nearly to their natural ſize and feeling. Throughout this cure it was obſervable that the vaginal coat contracted from above downwards, being at firſt very hard and painful upon preſſure; but, by degrees, the hardneſs went off, and it returned gradually to its natural ſize and ſoftneſs, going on, in this way, throughout its whole length, till the cure was completed. This patient has continued ever ſince free from the diſeaſe, and is at preſent in perfect health.

Case VIII. " A. M. thirty-eight years of age, for a twelvemonth had laboured under an hydrocele of the right teſticle, ſucceeding a virulent gonorrhœa. The operation was performed in the uſual manner, by completely laying open the vaginal coat. About twelve ounces of fluid were evacuated, and the teſticle appeared quite ſound. After being expoſed to the air for a few minutes, the ſides of the vaginal coat were brought together round the teſticle, and the edges of the wound made to touch by means of ſtraps of adheſive plaſter ſurrounding the whole ſcrotum. A large pledget of ſimple cerate was then laid on, extending from one end of the wound to the other in length, and about three inches in breadth, ſeveral folds of linen being put over the whole, and the uſual dreſſings applied. Having had little pain or fatigue from the operation, he was put to bed without any medicine; and, during the whole of the cure, which was completed in eighteen days, he had not the ſmalleſt complaint, except on the third and fourth days from the operation, when he complained of a ſlight pain ſtriking up to his groin, with an uncommon ſenſation of heat in the wound; but all theſe were relieved in two days by a drachm of the compound powder of jalap, which operated freely, and keeping the parts moiſt with the common ſolution of ſugar of lead. The hardneſs and pain having gradually decreaſed, the lips of the wound adhered by the firſt intention.

Case IX. "W. L—n, aged forty-eight, was afflicted with an uncommon ſwelling on the left ſide of the ſcrotum, eight inches in length from the one extremity to the other, and about three inches round near the middle, having ſome reſemblance at each end to a cylindric oval. In other reſpects he was healthy, and ſaid that the complaint came on without any perceptible cauſe. It was of four years' ſtanding, and the ſwelling had increaſed very gradually from below upwards. The operation was performed in the uſual way, but no more than five inches of the ſcrotum and vaginal coat were laid open. The wound was dreſſed as uſual with caddice, and a T bandage. As he complained of much pain from the operation, a draught, with thirty drops of laudanum was given him; notwithſtanding which, he had a very reſtleſs night, the pain having continued very ſevere, and increaſed towards morning. His pulſe being at ninety-ſix and full, I took away ten ounces of blood, and gave him a large watery injection in the afternoon, repeating the draught with ten drops more of laudanum at night.

" January 12th, Pulſe quick but ſoft; pain and tenſion continue. Applied a large emollient poultice over the whole ſcrotum, after having removed as many of the dreſſings as could be eaſily taken away. Twenty grains of the compound powder of jalap were then given every hour in a glaſs of barley-water till it operated.

" 13th, Pain and fulneſs ſomewhat relieved. Took three doſes of the powder, which operated fully. Poultice to be continued, and changed three times a-day.

" 15th, Dreſſings totally removed from the ſurface of the wound; the edges red, and flabby, and ſwelled, with little or no diſcharge. The wound was very ſlightly dreſſed with charpie. and the poultice ordered to be kept conſtantly applied. Pulſe eighty. He was allowed chicken-broth, with a ſmall part of the chicken for dinner.

" 18th, A kindly ſuppuration began to come on, and a ſeparation to take place of the dreſſings in the inſide of the vaginal coat; the edges of the wound alſo much leſs ſwelled, and looked better. They were dreſſed with ſtraps ſpread with ſimple cerate, and the centre being filled with caddice, dreſſed in the uſual manner.

24th, The whole of the dreſſings within the vaginal coat were this day removed; and the patient being entirely free from pain and uneaſineſs, was allowed to return to his uſual diet. The wound was dreſſed regularly every day, and the ſides of it kept together by adheſive ſtraps; but, as near an inch of the teſticle was expoſed to the air, by reaſon of the uncommon retraction of the ſkin, which I was not able to prevent, it was ten weeks before it was wholly cicatrized. While the edges of the ſcrotum healed in this manner, granulations ſhot up from the body of the teſticle itſelf; and theſe, even after the ſkin had covered them, continued to be very tender, and ſtill remain ſo, though he has never had the ſmalleſt return of the diſeaſe."

The laſt of Mr. Latta's caſes we ſhall preſent the reader with is,

CASE X. "W. B. aged fifty-two, laboured under a large hydrocele of the right vaginal coat, of a pyramidal ſhape, and extending nine inches downwards, with the ſmall end uppermoſt. The ſwelling was ſo great, that the penis had totally diſappeared; and it was eaſy to perceive a fluctuation by alternating the preſſure with the hands at a conſiderable diſtance from one another, though the rays of light did not paſs through it. The complaint was of no leſs than four years' ſtanding, and had originated from an accidental bruiſe on the right teſticle. Little or no ſwelling was perceived for the firſt year, except at the under point, but after this it gradually increaſed, and before the laſt twelvemonth acquired about half the ſize it had when I ſaw him. In all other reſpects he was healthy, except that at times he had a pain in the ſmall of his back, which, he thought, was occaſioned by the exceſſive weight of the ſcrotum. The ſize of the tumor was ſo great, that I propoſed at firſt only to draw off the water by means of the trocar; I accordingly made an opening in the ſkin of about half an inch long with a lancet, introducing afterwards the flat trocar through this opening a little below the ſkin, turning its point, and puſhing it cautiouſly upwards and backwards through the vaginal coat. This was followed by the diſcharge of a dark-coloured fluid; but, when about one half ſeemed to be drawn off, it ſtopped at times almoſt entirely, though a pretty large probe was frequently introduced. I now ſuſpected, as in a caſe already mentioned, that the water was contained in hydatids; for which reaſon the canula was removed along the probe, leaving the end of it within the vaginal coat, to ſerve as a conductor for a grooved directory, which was introduced, and the opening enlarged by the ſtraight probe-pointed knife to about two inches, through which the whole contents of the ſac were immediately diſcharged, and a conſiderable number of hydatids of various ſizes came away. On examining the teſticle with my finger it appeared ſound, but felt rather ſoft and flabby. I introduced a piece of double caddice, exactly broad enough to fill the wound, and dipped in oil. This was put about two inches within the vaginal coat, the other end being left freely hanging out; ſeveral folds of caddice being laid over all, and the dreſſings retained in the uſual manner with a bandage. The quantity of water drawn off by this operation was five pounds and a half; and, as the patient had ſat in a chair during the whole time, he was now become a little faintiſh; but being put to bed, and having a glaſs of wine given him in an horizontal poſture, he ſoon recovered. He had no complaint, excepting that, on the third day after the operation, he had a little degree of pain, heat, and tenſion, with ſome fulneſs and hardneſs near the ring. For this he had ſeven drachms of Rochelle ſalt, diſſolved in ſome weak tea, which operated fully two or three times. The dreſſings were removed on the fifth day after the operation, a poultice having been previouſly applied for 24 hours. In this caſe the caddice introduced within the vaginal coat came alſo away at this time; and, along with this, nearly four ounces of a high-coloured fluid. The lips of the wound, as well as almoſt the whole under half of the ſcrotum, continued ſwelled and inflamed; and the upper part of the vaginal coat, from the ring downward, felt hard, contracted, and painful, eſpecially when preſſed, but not otherwiſe. A piece of caddice, dipped in oil, was again introduced as formerly; and the wound dreſſed as before. The dreſſings were removed in three days, by which time the edges of the wound had begun to ſuppurate and diſcharge freely. The ſame mode of dreſſing was continued; and, by introducing caddice in this way every ſecond day, the patient was able, in three weeks from the operation, to walk about eaſily, though the wound was not quite healed up, only much contracted, as well as the whole of the ſcrotum, a little fulneſs being all that remained at the under end of the teſticle, and downward to the opening. The ſore was completely healed in four weeks from the operation, and the patient reſtored to his full health and ſpirits, and the ſize of the ſcrotum nearly natural.

"I operated," continues Mr Latta, "in the ſame manner on a patient aged ſixty, from whom I took ſix pounds of water, and in twenty-four days the patient was completely cured, without taking a ſingle medicine of any kind; only, as the diſcharge was very conſiderable, the matter being high coloured and fœtid, throughout the whole of the cure, it was neceſſary to throw up a weak ſolution of lead into the wound, of no more than three grains of the ſalt to an ounce of water.

"In March, 1792, I acted as an aſſiſtant to a gentleman in the country, who had under his care a patient ſixty-four years of age, afflicted with an hydrocele ſtill larger than any of thoſe I have yet mentioned; and, on my propoſal, he immediately agreed to proceed as in the laſt two caſes. Seven pounds of water were evacuated on making an opening about two inches long in the ſkin of the ſcrotum, and then piercing the vaginal coat with a lancet, made the opening here of the ſame extent. The cure went on without the leaſt difficulty, and was completed in four weeks. The patient got no medicine throughout the whole courſe of the cure, excepting once or twice a gentle laxative."

Mr. Latta adduces ſeveral other circumſtantial teſtimonies in behalf of cure by inciſion (which indeed was preferred by the late Mr. Hunter), but for theſe we recommend our readers to conſult the work itſelf.

Cure by injection.] Beſides the methods already mentioned, another has been lately revived, viz. the injecting of irritating liquors into the vaginal coat of the teſticle. This method is particularly deſcribed by a Monſieur Lambert of the laſt century, and may be of much older date for any thing which is known to the contrary. From ſome cauſe or other it ſeems to have been entirely laid aſide till about the middle of the preſent century, when it was practiſed by Dr. Monro (afterwards a phyſician-general in the Weſt Indies), under the ſanction of the late Mr. Monro, and favourably received and followed by ſome of the firſt ſurgeons of this place. But in general, though the cure appeared complete, the diſeaſe returned.

The preference is uſually given to wine, and commonly that is ſomewhat diluted; but where no pain is excited by the injection, the liquor ſhould be diſcharged, and a ſtronger one uſed. For where no pain takes place, a cure is not to be expected.

The following is the moſt approved method of performing the operation: the operator ſhould be provided with a flat trocar and canula, and with a bag of reſina elaſtica, fitted with a ſtop-cock and pipe, which ought exactly to ſuit the canula.

The patient being laid in an horizontal poſture, either upon a bed or a table, the water ſhould be drawn entirely off from the tumor by a flat trocar paſſed into the under and fore part of it. The operator ſecuring the canula with the one hand, is with the other to paſs the tube of the injection-bag fairly through it, and with gentle preſſure to force in as much of the liquid as may reach the whole ſurface of the vaginal coat, as well as the whole ſurface of the teſticle. The bag ſhould now be removed, leaving the tube within the canula of the trocar, ſo that by turning the ſtop-cork the injection may be retained in the cavity of the tumor. The canula of the trocar ought ſtill to be kept fixed, otherwiſe it might recede, by which the liquid would inſinuate into the cellular ſubſtance of the ſcrotum. The liquor ſhould likewiſe be brought into contact with every part of the cavity; and after remaining about four, or at the moſt five, minutes in the ſac, it ſhould be entirely diſcharged through the canula of the trocar, after withdrawing the tube of the elaſtic bag.

Sometimes intenſe pain is felt immediately after the liquor is thrown in. When this is the caſe, it ſhould be diſcharged as ſoon as it has paſſed over the different parts of the tunica vaginalis. Some recommend a repetition of the ſame kind of injection immediately after the firſt has been diſcharged, and to be retained for the ſame period, though this is not commonly practiſed.

The whole of the injection ſhould be completely diſcharged, after which the ſcrotum ſhould be covered with a pledget of cerate, a compreſs being applied over it, and retained with a ſuſpenſory bag. The patient ought to be in bed for ſeveral days, and ſupport the ſcrotum in the bandage by means of a ſmall pillow.

Though it is difficult to aſcertain the proportion of thoſe who are cured by the method of injection, and though it is to be regretted that hitherto the diſeaſe is found to return in a ſmall proportion of thoſe upon whom this operation has been performed; yet, on account of the facility with which it can be done, the comparatively ſmall pain with which it is attended, the quickneſs of the cure, and chiefly becauſe it does not, in caſe of a return of the diſeaſe, preclude the future operation of inciſion, it appears a method which, in all probability, will be more and more adopted into practice.

SECT. III. *Of* HYDROCELE *of the* SPERMATIC CORD.

Anaſarcous hydrocele of the ſpermatic cord ſometimes accompanies aſcites, and at other times it is found to be confined to the cellular ſubſtance in or about the ſpermatic cord. The cauſes of this diſeaſe may be, obſtructions in the lymphatics leading from the part in conſequence of ſcirrhous affections of the abdominal viſcera, or the preſſure of a truſs applied for the cure of hernia.

When the affection is connected with anaſarca in other parts, it is then ſo evident as to require no deſcription. When it is local, it is attended with a colourleſs tumor in the courſe of the ſpermatic cord, ſoft and inelaſtic to the touch, and unaccompanied with fluctuation. In an erect poſition of the body it is of an oblong figure; but when the body is recumbent, it is flatter and ſomewhat round. Generally it is no longer than that part of the cord which lies in the groin, though ſometimes it extends as far as the teſticle, and even ſtretches the ſcrotum to an uncommon ſize; an inſtance of which is related by Mr. Pott, who from a ſwelling of this kind diſcharged eleven Engliſh pints at once. By preſſure a great part of the ſwelling can always be made to recede into the abdomen. It inſtantly, however, returns to its former ſituation on the preſſure being withdrawn.

When the tumor is connected with general anaſarca of the ſyſtem, it can only be cured along with the reſt of the diſeaſe; but when the ſwelling is local, the remedy is alſo to be locally applied. An inciſion is to be made of ſuch a ſize as may be ſufficient for diſcharging the whole of the water; in the performance of which, attention is neceſſary to guard againſt hurting the ſpermatic veſſels. The contents of the tumor being diſcharged, the ſore is to be treated like any other ſimple wound.

ENCYSTED HYDROCELE of the ſpermatic cord ſometimes begins in the upper, but generally at the lower part of the ſpermatic cord. On its firſt appearance it is ſo ſmall as to give little or no trouble; hence it is ſeldom particularly attended to till it has acquired a conſiderable ſize. By degrees it extends as far as the abdominal muſcles, and ſometimes reaches to the bottom of the ſcrotum; and to a perſon unacquainted with the appearance of the diſorder, may be miſtaken for a hydrocele of the tunica vaginalis. But here the tumor is always above the teſticle, which is diſtinctly felt below; and even in the advanced ſtate of the diſeaſe the teſticle is found in the back part of it perfectly unconnected with the ſwelling; whereas, in the advanced ſtages of hydrocele in the vaginal coat, although ſome hardneſs is diſcovered where the tunica vaginalis adheres to the teſticle, yet when the ſwelling is great the teſticle cannot be diſtinctly felt. In the encyſted hydrocele of the cord, the figure and ſize of the penis is little altered; whereas, in caſes of common hydrocele, the penis frequently diſappears almoſt entirely. In other reſpects the two diſeaſes are nearly ſimilar. It ſometimes happens that the water is contained in two diſtinct cells. In that caſe the tumor is ſomewhat puckered up, or diminiſhed in its diameter. A ſimilar appearance alſo occurs, when this variety of the diſeaſe is connected with hydrocele of the tunica vaginalis, which ſometimes takes place.

The only other tumor with which this one may be confounded are, the anaſarcous hydrocele of the ſpermatic cord, and a real hernia. But in neither of theſe is the fluctuation of a fluid perceptible, and to the touch they are both ſoft and inelaſtic; whereas, in this variety of hydrocele, the tumor has a ſpringy feel, and a fluctuation is ſenſible to the touch; and in both the one and the other the ſwelling recedes ſomewhat upon preſſure, which it never does here.

From hernia it is chiefly diſtinguiſhed by the tumor beginning ſome way down the cord. In hernia the tumor diminiſhes when the patient is in an horizontal poſture, and is conſiderably affected by coughing and ſneezing; but this kind of hydrocele is not altered in ſize by any ſuch circumſtances, nor has it the common ſymptoms which attend a hernia.

Infants are frequently ſubject to this diſeaſe, as well as to an anaſarcous ſwelling of the cord, and an œdematous tumor of the ſcrotum. But here the complaint is ſeldom permanent; for in moſt inſtances it readily yields to gentle friction, with any ſtimulating or aſtringent application, as a ſtrong ſolution of ſal ammoniac in vinegar, &c. But in adults, the ciſt, in every variety of encyſted hydrocele, becomes ſo firm as not to be affected by external applications; ſo that when the tumor becomes large, it is neceſſary to uſe means for producing either a palliative or radical cure, in the ſame manner as is done for a hydrocele of the vaginal coat.

SECT. IV. *Of* HÆMATOCELE SCROTI.

We ſhall mention in this place the diſeaſe called *hæmatocele ſcroti*, which is occaſioned by blood extravaſated in the inner ſubſtance of the ſcrotum, in the tunica vaginalis, or in the ſpermatic cord; but the uſual ſituation is in the tunica vaginalis teſtis.

Tumors of this kind may be produced by any thing which ruptures the blood-veſſels of the part, but they are commonly the conſequence of external violence. In the tunica vaginalis this diſorder may be produced by the point of a trocar, or of a lancet, in tapping for hydrocele. In ſuch a caſe, we are commonly informed of the accident by blood being diſcharged along with the water; though ſometimes it does not appear till the whole of the water is evacuated, and then a tumor of a conſiderable ſize ſuddenly takes place. Sometimes it happens where the quantity of water has been ſo uncommonly great that the ſudden diſcharge of it, by taking away the ſupport which the veſſels have been accuſtomed to receive, has been the cauſe of their rupture; and it ſeems certain, that whenever a tumor is produced either in the ſcrotum, or cord, ſuddenly after the water of a hydrocele has been evacuated by tapping, that it is entirely owing to an extravaſation of blood.

In the ſpermatic cord, injuries of the ſame kind will be attended with a ſimilar effect upon the veſſels of the ſac containing the water. The diſtinction between blood and water in the ſubſtance of the ſcrotum is readily made by the colour; for where the diſeaſe is produced by blood, it forms a real ecchymoſis. The tumor feels heavier in the tunica vaginalis when filled with blood, than where it is filled merely with water; the treatment is nearly the ſame with that of hydrocele. In the commencement of the anaſarcous or diffuſed hæmatocele, when produced from ſlight external violence, the application of ſtimulating or aſtringent fluids will ſometimes diſcuſs it; but if this prove ineffectual, the tumor is to be laid open, and treated exactly as was directed for hydrocele; only if a ruptured veſſel be diſcovered, it muſt be ſecured by ligature. In like manner, all collections of blood either in the vaginal coat or ſpermatic cord are to be laid open, and treated as in hydrocele. If bleeding veſſels appear, they are to be ſecured. Sometimes, however, theſe cannot be detected; an oozing takes place which it is difficult to reſtrain, even by the uſe of bark, vitriolic acid, and other means generally employed in ſuch caſes. It has been uniformly found, that local remedies prove chiefly uſeful here, particularly the application of ardent ſpirits, æther, or tincture of myrrh, to the ſurface of the ſore. Pledgets of ſoft lint, ſoaked in one or other of theſe, not only ſerve to check the diſcharge of blood, but in general tend to promote the formation of good matter.

CHAP. XXV. *Of* VARICOCELE, CIRCOCELE, SPERMATOCELE, *and* PNEUMATOCELE.

VARICOCELE is a preternatural diſtenſion of the veins of the ſcrotum, which in this ſtate form a tumor of hard, knotty inequalities, ſeldom painful, and generally attended with no inconvenience excepting what ariſes from its bulk. *Circocele* is ſimilar in its nature to the former, but ſituated in the ſpermatic cord, extending from the abdominal ring to the ſuperior part of the ſcrotum, and produced by a varicoſe ſtate of the ſpermatic vein. Both of theſe diſorders are occaſionally produced by obſtruction in the veins; but are moſt frequently owing to a relaxed ſtate of theſe veſſels; to which we may add, that on account of the ſmallneſs of the correſponding artery, they are not ſufficiently affected by its influence. The tumor produced by theſe diſorders is ſometimes ſo large as to appear like a hernia or hydrocele; but we diſtinguiſh it from theſe by the touch, for varicoſe veins are like worms filled with elaſtic matter. We have another mark upon which we can ſtill more depend: the tumor in the erect poſture of the body is much increaſed, while in the horizontal ſituation it almoſt entirely diſappears.

Another diſorder is obſerved by late authors, where a collection of blood is ſometimes found within the tunica albuginea teſtis, and is ſuppoſed to be a kind of hæmatocele, or more probably varicocele. Sometimes the collection is ſo conſiderable, that a fluctuation reſembling that of an hydrocele of the vaginal coat of the teſticle is obſervable. When this is miſtaken for hydrocele, and an opening is made into it with a trocar, a diſcharge is produced of a duſky-coloured blood, ſomewhat reſembling thin chocolate: but though the tumor may be diminiſhed by the evacuation thus obtained, yet the alteration is inconſiderable; nor is the patient ever relieved, but on the contrary made worſe by ſuch an operation. Caſtration, after this, becomes neceſſary; but even this has been found ineffectual: ſo that the patient had better be adviſed to truſt to nature, aſſiſted by a proper ſuſpenſory bandage, than to ſuffer the attempt of a radical cure; for it has been obſerved, that in ſome inſtances they have remained ſtationary for many years, whereas they never fail to become much worſe by any attempt to evacuate the fluid.

When tumors, or the preſſure of a truſs, have been the cauſe of ſuch complaints, a proper attention to theſe ought to be the firſt attempt towards a cure. But when a relaxed ſtate of the veins is ſuſpected, we ought to recommend a ſuſpenſory bandage, an horizontal poſture, the cold bath, and the application of a ſolution of alum and other aſtringents. By a proper exhibition of theſe, the diſeaſe may at leaſt be prevented from increaſing, ſo as to render any operation unneceſſary.

By *ſpermatocele* is underſtood a morbid diſtenſion of the vas deferens and epididymis. The diſeaſe may ariſe from tumors, ſtricture, or inflammation about the vas deferens, or its termination in the penis; but more probably from inflammation there. When an inflammatory diſpoſition is diſcovered, general and topical blood-letting, gentle laxatives, a low cooling diet, and reſt of body, will commonly be found the beſt remedies. When tumors are found to preſs upon the vas deferens, they ought either to be brought to a ſtate of ſuppuration, or entirely extirpated, if that can be properly effected. If the diſeaſe proceed from a venereal cauſe, nothing can be ſo uſeful as a courſe of mercury properly directed.

By PNEUMATOCELE is underſtood a diſtenſion of the ſcrotum from a collection of air.

The principal cauſe of this diſeaſe, which rarely happens, is wounds in the lungs, by which air paſſes through the common cellular ſubſtance into the ſcrotum; but from whatever cauſe the tumor is produced, the diſeaſe is to be treated by making ſmall punctures with the point of a lancet, as in the caſe of anaſarcous ſwellings formed by water.

CHAP. XXVI. *Of* SARCOCELE, *or* SCIRRHOUS TESTICLE.

SARCOCELE implies a fleſhy, enlarged ſtate of the teſticle, much firmer and harder to the touch than is obſerved in hernia humoralis or inflamed teſticle.

Symptoms.] The ſymptoms vary exceedingly in different patients; but the following are the moſt general: the firſt ſymptom is commonly a ſmall enlargement, without much pain, and no diſcolouration of the part. The tumor becomes gradually larger, and the hardneſs increaſes; but for a conſiderable time the ſurface remains ſmooth; and when the conſtitution is otherwiſe good, the diſorder will ſometimes remain in this ſituation for a conſiderable number of years; and in a few rare inſtances, by a moderate diet, keeping the belly open, ſuſpending the tumor properly, and avoiding violent exerciſe, or any thing which may conſiderably increaſe the impetus of the blood, the diſorder has not only been prevented from increaſing, but has in a gradual manner diſappeared entirely: More commonly, however, the tumor increaſes in ſize, and becomes ragged and unequal on its ſurface. Smart and ſevere ſhooting pains are frequently felt through its ſubſtance. Sometimes ſerum is extravaſated in the vaginal coat, or matter is collected in different parts of the tumor. The ſcrotum, now much diſtended, burſts, and thin, fetid, bloody matter diſcharging, the diſeaſe terminates in an ulcerated cancer of the worſt kind.

The ſpermatic cord is commonly unaffected till the tumor has acquired a conſiderable ſize, and generally not till collections of matter have been formed. After this, from being at firſt only ſlightly ſwelled, it gradually increaſes in hardneſs and bulk; after which it becomes very painful, knotty, or unequal through its whole extent. The diſcharge from the ſcrotum ſtill continues; but although the matter increaſes in quantity, the ſize of the tumor is not thereby diminiſhed, but, on the contrary, continually increaſes; the edges of the ſore become hard, livid, and retorted, and fungous excreſcences puſh out from every part of it; the health of the patient becomes entirely deſtroyed, and he is at laſt carried off in great miſery.

Hernia humoralis produced by venereal infection has been conſidered, by ſome authors, as a frequent cauſe of the worſt kind of ſcirrhous teſticle; but the fact is very much otherwiſe; and ſuch an idea has this bad tendency, that it prevents the perſeverance in the uſe of ſuch remedies as might have removed the diſeaſe without the neceſſity of extirpation.

Another cauſe mentioned by authors as producing ſcirrhus of the teſticle, is the hydrocele of the vaginal coat; but though ſarcocele is frequently combined with this diſeaſe, there is every reaſon to think that the primary diſorder was in the teſticle itſelf, and that the water is only a conſequence of the other complaint. When the hydrocele happens to be the original diſeaſe, the teſticle is alſo found frequently altered in its appearance. It is here paler than in its natural ſtate. It is ſometimes diminiſhed, but more frequently enlarged. The enlargement, however, is ſoft, harmleſs, and free from pain; and in ſuch a ſituation ſhould never be extirpated. To this point particular attention ought to be paid, otherwiſe we run the riſk of committing a miſtake, into which practitioners have been too frequently led—the extirpation of a teſticle which ought to have been ſaved. To keep free of this error, we ought to attend to the following circumſtances.

When the diſeaſe begins in the teſticle itſelf, eſpecially in the body or glandular part, or when it becomes hard and enlarged previous to any collection of water in the vaginal coat, it is to be conſidered as of a different nature from that in which an enlargement of the part ſucceeds to a collection of water; or if, upon evacuating the water, the teſticle be found hardened, enlarged, and attended with pain and other marks of ſcirrhus, eſpecially if the ſurface be unequal or ulcerated, extirpation ought certainly to be performed. The ſymptoms above mentioned ſometimes, though rarely, begin in the epidydimis. In ſuch caſes, however, extirpation will ſeldom be adviſable, as there is here always a ſuſpicion of a venereal affection; and then we ought by all means to try the remedies commonly uſed in ſuch diſeaſes. In the prognoſis, we attend to the age and the habit of the body, as well as to the ſtate of the diſeaſe, and length of time it has continued.

When the patient is young and the conſtitution unbroken, we may always hope for a cure, although the ſymptoms ſhould be very conſiderable; whereas, in old infirm people, and in habits attended with an emaciated look, with indigeſtion, and other ſymptoms of obſtructed viſcera, whatever ſtate the diſeaſe may be in, there will be but a ſmall chance of ſucceſs.

If the diſeaſe has ſubſiſted for a long time without conſiderably increaſing in ſize, we may reaſonably think it is of a milder nature than where it has made a rapid progreſs. As long as the teſticle is only hard, and free from the formation of matter, we may expect a favourable event; but where collections of matter have already formed, either in the ſubſtance or upon the ſurface of the teſticle, there is no other chance of ſaving the patient than by means of extirpation. Previous to this, however, we are to attend to the ſtate of the ſpermatic cord; for were any of it left in a diſeaſed ſtate, little advantage could be derived from extirpation; nor ought the operation ever to be performed but where we can reach the whole of the diſeaſed parts. We are not to be prevented from performing it, though the cord ſhould be conſiderably enlarged, provided it do not evidently partake of the diſeaſe of the teſticle; for the cord is generally ſomewhat enlarged in the diſeaſed ſtate of the teſticle; but this enlargement is for the moſt part merely either a varicoſe ſtate of the veins, or a watery diſpoſition of the cellular ſubſtance.

Cure by the operation.] But ſuppoſing no obſtacle to the operation, the method of doing it may be this. The parts being previouſly ſhaved, the patient is to be laid upon a ſquare table of about three feet four inches high, letting his legs hang down: which, as well as the reſt of his body, muſt be held firm by aſſiſtants; or he may be laid acroſs a bed in the ſame manner. Then with a knife the inciſion is to be begun above the rings of the abdominal muſcles, that there may be room afterwards to ſecure the veſſels; then carrying it through the membrana adipoſa, it muſt be continued downward to the bottom of the ſcrotum. A firm, waxed flat ligature, compoſed of ſmall threads, is next, by means of a curved needle, to be paſſed round the ſpermatic cord, at leaſt an inch above the diſeaſed part, or as near the abdominal ring as poſſible; after which the veſſels are to be ſecured by a running knot, and divided about a quarter or half an inch below the ligature. The cord and teſticle are then to be removed from the ſurrounding parts by diſſecting from above downwards, and no inſtrument is better for this purpoſe than the common ſcalpel. After the diſeaſed parts are removed, the knot upon the cord muſt be ſlackened to diſcover the ſpermatic arteries and veins; both of which, by means of the tenaculum or a common forceps, are to be taken up. The ligature upon the ſpermatic cord is now to be left looſe, ſo as to act as a tourniquet if a hemorrhagy ſhould enſue; nor is there more occaſion for leaving the ligature tied than for leaving a tourniquet firmly applied to one of the extremities after amputation; beſides, where patients have ſuffered ſuch pain as is ſometimes mentioned by authors, it has been found to be owing to the tightneſs of the ligature rather than to any other cauſe. In dividing the ligatures of the blood-veſſels at the extremities of the cord, they muſt be left at ſuch a length, without the wound, as to be readily removed, however much the cord may retract in the time of the cure.

In ſeparating the teſticle, a conſiderable hemorrhagy ſometimes enſues from the diviſion of the ſcrotal arteries. In ſuch a caſe, they ought always to be fixed with ligatures before proceeding in the operation. The parts being removed, and the blood-veſſels ſecured, the wound is to be cured, if poſſible, by the firſt intention; and for this purpoſe the ſides of the ſcrotum are to be brought together in the moſt accurate manner, beginning at the under end, and ſecuring the parts by adheſive plaſter as we proceed upwards, and in ſuch a way that the ſides of the ſore may be kept properly together. About two inches of the ligatures of the cord are to be left out, and this part of the wound treated in the ſame manner as the reſt; the whole to be ſecured by a compreſs of linen and a T bandage.

Subſequent Treatment.] The patient ſhould now be laid to reſt, and an opiate adminiſtered; and if, upon the ſecond or third day, any inflammatory ſymptoms enſue, they are to be removed by methods commonly employed upon theſe occaſions; as, topical blood-letting, gentle laxatives, and keeping the part conſtantly moiſt with a ſolution of vitriolated zinc. The dreſſings ought not to be allowed to ſhift, elſe the cure will be greatly retarded. They are to be examined about four or five days after the operation; and if nothing material has happened, they may be allowed to remain two or three days longer, by which time generally the ligature can be readily removed; and the wound will be healed by the firſt intention, excepting ſome ſmall opening in the ſkin, more eſpecially where the ligatures were placed. Theſe are to be drawn together by adheſive ſtraps, and dreſſed in the ſame manner as formerly. In this way, if the patient be otherwiſe healthy, a cure may be expected in little more than a fortnight.

The method of dreſſing moſt frequently practiſed is to apply a quantity of ſoft lint to the ſore, and then a compreſs of linen over it, and to ſecure the whole with a T bandage or a ſuſpenſory bag. But whatever courſe may be taken in this reſpect, the ſore is not to be touched till a free ſuppuration takes place, which will commonly be about the fifth or ſixth days, and then the dreſſings ſhould be removed and renewed from time to time; once every two days or oftener, as the quantity of matter may render it neceſſary. Sometimes after the operation the patient complains of pain in the ſore, and of tenſion and uneaſineſs in the belly. In ſuch a caſe, warm fomentations ſhould be applied to the abdomen, and the ſore covered with an emollient poultice, and this repeated as often as may be neceſſary.

CHAP. XXVII. Of CALCULI.

Sect. I. *On the nature of* Urinary Concretions *in general.*

It is only ſince the time of *Scheele* that we have become acquainted with the nature of urinary calculi, this ſubject having been quite in the dark before that great chemiſt diſcovered, in the year 1776, a peculiar acid (the *lithic* acid) in them, and at the ſame time found them to contain no lime, a circumſtance which was ſoon after confirmed by the experiments of *Bergmann.* From this period, the chemiſts beſtowed a particular attention upon the examination of urinary concretions, as appears from the writings of *Dobſon*, *Percival*, *Falconer*, *Achard*, *Hartenkeit*, *Tychſen*, *Link*, *Titius*, *Walther*, *Gartner*, *Brugnatelli*, *Pearſon*, and ſeveral others, ſome of whom confirmed the diſcovery of *Scheele*, while others contradicted, and others enlarged it.

But we are particularly indebted to *Cit. Fourcroy* and *Vauquelin*, who, ſince 1786, had turned their attention to this ſubject, for having made many experiments, by which great light is thrown on the ſubject. We deem it highly proper to communicate to our readers in the following extract, the intereſting reſults of their chemical enquiries, principally on account of the influence they have on the treatment of the diſeaſed ſtate of thoſe parts on which urinary calculi are depoſited.

Seat and phyſical properties of Urinary Calculi.] Calculi are found in different parts of the urinary ſyſtem, in the pelvis renalis, in the ureters, in the bladder, and urethra; but as they, for the moſt part, originate in the pelvis renalis, the calculi renales make the nucleus of the greateſt number of urinary ſtones. The *calculi renales* differ greatly with reſpect to their external qualities; for the moſt part, however, they conſiſt of ſmall, concrete, roundiſh, ſmooth, gloſſy, and cryſtalline bodies, of a red-yellow colour, like that of wood, and ſo hard as to admit of poliſhing. On account of their minuteneſs, they eaſily paſs through the urinary paſſages in form of gravel, which being ſometimes of a rough ſurface, cauſe ſeveral complaints on their paſſage. But in ſome inſtances they are of too great a ſize to be able to penetrate through the ureters; in which caſe they increaſe in the kidneys, to the manifeſt injury of them. Calculi renales of this kind are generally of a brown, dark red, or black colour, and ſurrounded with ſeveral ſtrata of coagulated blood and pus; they have alſo been obſerved of a yellow, reddiſh, and lighter colour; and ſome conſiſting of an homogeneous ſtony maſs: but white or grey calculi renales are very rarely to be met with. Amongſt the great number that were examined by Fourcroy, he only found one or two of a grey or blackiſh colour, and a compoſition ſimilar to thoſe which generally bear the name of mulberry-like ſtones.

The ſtones in the ureters are calculi renales, which on paſſing into the ureters are prevented by their ſize from deſcending into the bladder, and frequently increaſe very much; they, however, rarely occur, but ſtill rarer are the internal ſtony coverings of the ureters, which entirely obſtruct the paſſage of urine; their colour is white; and they conſiſt of phoſphat of lime.

The ſtones in the bladder are the moſt frequent urinary concrements that have been principally examined; they draw their firſt origin from the kidneys, whence they deſcend into the bladder, where they increaſe, or they immediately originate and increaſe in the bladder; or they ariſe from a foreign body that by chance has got into the bladder, which not unfrequently happens, particularly in the female ſex. Concrements of this kind differ greatly in their reſpective phyſical qualities and external form, which, however, is generally ſpherical, oval, or compreſſed on both ſides; and ſometimes, when there are ſeveral ſtones in the bladder, they have a polyedrous or cubical form; their extremities are frequently pointed or roundiſh, but they are very ſeldom found cylindrical, and more rarely with cylinders at their ends.

There is a great variety in the ſize of the calculi, and likewiſe in their colour, which is materially different according to their reſpective nature and compoſition. They occur, 1. of a yellowiſh colour, like wood, approaching nearly to red or brown; ſuch ſtones conſiſt of lithic acid. 2. Grey, or more or leſs white; theſe ſtones always contain phoſphats of earths. 3. Dark grey or blackiſh; ſtones of this colour have oxalats of earths. Many ſtones ſhew brown or grey ſpots on a yellow or white ground, generally raiſed on the ſurface, and conſiſting of oxalat of lime, which is incloſed in lithic acid when the ground colour of the ſtone is of a wood colour, or in phoſphat of lime when it is white. Theſe ſpots are, in general, only to be obſerved in the middle of the ſtone, or at one of its extremities. All that has been ſtated is the reſult of obſervations on more than 600 calculi; and different other colours that are ſaid to have been obſerved, either ariſe from heterogeneous ſubſtances, or are merely variations of the above colours. Their ſurface is ſmooth and poliſhed in ſome, in others only ſmooth, and in others uneven, and covered with rough or ſmooth corpuſcles, which are always of a yellow colour; in ſome the ſurface is partly ſmooth, and partly rough. The white ones are frequently even and ſmooth, half tranſparent, and covered with ſhining cryſtals, that generally indicate phoſphat of ammonia with talc; or they are faint, and conſiſt of minute grains; or rough, in which caſe they conſiſt of phoſphat of lime. The brown and dark grey ſtones are, from their ſimilarity to mulberries, called mulberry-ſtones, and being frequently very rugged, they cauſe the moſt pain of all.

On examining the ſpecific weight of urinary calculi in more than 500 ſpecimens, it was found to be in the lighteſt 1,213: 1,000, in the heavieſt, as 1,976: 1,000. Their ſmell is partly ſtrong, like urine or ammonia, partly inſipid, and terreous; for inſtance, the white ones, which are like ſawed ivory or raſped bone.

The internal texture of calculi is but ſeldom gueſſed from their external appearance, particularly when they exceed the ſize of a pigeon's egg. On breaking them they generally ſeparate into two or three ſtrata, more or leſs thick and even, which prove that they are formed by different precipitations at different times. In the middle a kernel is generally ſeen, of the ſame maſs as the reſt. When the place they are broken at is finely ſtreaked, and of a yellow or reddiſh colour, the lithic acid predominates; but when they are half tranſparent, luminous like ſpar, they have ammoniacal magneſia in them, and phoſphat of lime when they are brittle and friable; but when they are ſo hard as to reſiſt the inſtrument, of a ſmooth ſurface, and a ſmell like ivory, they contain ſaccharic lime. It frequently happens, that the exterior ſtratum conſiſts of white phoſphat of earth, while the kernel is yellow lithic acid or oxalat of lime, covered ſometimes with a yellow ſtratum of lithic acid, in which caſe the kernel appears radiant; but when it conſiſts of lithic acid, and is covered with white phoſphate of earth, it is roundiſh, oval, and ſomewhat crooked. Theſe concrements have very ſeldom three ſtrata; namely, on the outſide a phoſphat of ſalt, towards the inſide lithic acid, and quite within ſide, an oxalat of lime; but ſtill rarer theſe ſubſtances occur in more ſtrata or in another order, as before mentioned. Stones of the urethra are ſeldom generated in the urethra itſelf; however, there are inſtances of their having been formed in the foſſa navicularis by means of foreign bodies that have got into the urethra. We alſo very frequently obſerve ſtony concrements depoſited between the glans and prepuce. All the concrements, produced withinſide and outſide of the urethra conſiſt of phoſphats of earths, which are eaſily precipitated from the urine. There are likewiſe ſtones in the urethra, which have come out of the bladder, having been produced there, or in the kidneys, and they generally poſſeſs the properties of ſtones of the kidneys.

Conſtituent particles of urinary ſtones.] It has been mentioned above that Scheele found a peculiar acid in the urinary concrements, and likewiſe that phoſphat of lime was diſcovered in them. The identity of the lithic acid, however, was much doubted by modern chemiſts, particularly by *Pearſon*, who aſſerted that it was merely an oxyd, whereby he gave riſe to the diſcoveries Cit. *Vauquelin* and *Fourcroy* ſince made on this ſubject, becauſe they were induced to repeat the experiments which had been propoſed to the public, in order to examine whether the lithic acid be really an acid, or to confirm the former opinion of it. Their endeavours were fully rewarded, as they not only found the lithic acid and phoſphat of lime in the different calculi, but alſo five other ſubſtances, viz. the lithat of ammonia, oxalat of lime, ſiliceous earth, phoſphat of ammoniacal magneſia, and an animal matter.

1. *Lithic or uric acid.* The acid diſcovered by Mr. Scheele in the urinary concrements was ſtyled lithic acid; or, according to Dr. Pearſon's reſearches, uric acid, which, after Scheele, has the following properties. It is inſipid, without ſmell, hard, cryſtallizible, not ſoluble in cold water, and in boiling water only in ſeveral thouſand times greater quantity. This ſolution, after having become cool, depoſits the acid in form of minute yellow needles, eaſily ſoluble in the ley of fixed alkalis, out of which, however, it is precipitated by all acids, even the carbonic acid, except the ſulphuric and muriatic acid, which have no effect on it. Concentrated nitric acid, on diſſolving it, obtains a red colour. On diſtilling the lithic acid it yields a ſmall quantity of ſublimed, undecompoſed uric acid, very little oil and water, cryſtallized carbonat of ammonia, carbonic acid, and a very black coal, which, however, contains neither alkali nor lime. Beſides theſe properties, it poſſeſſes ſtill others, according to our reſearches. On rubbing it with concentrated ley of kali or natron, it immediately forms a ſaponaceous, thick, and pulpy maſs, which is very ſoluble in water when ſuperſaturated with alkali, but little ſoluble when only ſaturated with it. The ſaturated combinations have little taſte, are not cryſtallizible, and when diluted with water, the muriatic acid precipitates the uric acid in form of ſmall, needle-like, ſhining, ſomewhat yellowiſh cryſtals. Ammonia receives very little of it, which combination is almoſt quite indiſſoluble. Lime water has likewiſe very little effect on it, and the carbonats of alkalis none at all. On being diſſolved in nitric acid, a part of the lithic acid is changed into oxalic acid. The red colour which appears after this combination is ſaid to prove, according to Pearſon, that ſubſtance to be merely an oxyd, but it ariſes from a pecu-

liar animal matter. When oxgenated muriatic acid is brought in contact with lithic acid, the colour of it grows pale, it puffs up, becomes ſoft and gelatinous, and at laſt obtains the conſiſtency of a milky liquor; from which proceſs only $\frac{1}{60}$ of a white, light, animal ſubſtance remains, and a quantity of carbonic acid evolves itſelf under continual ſlow efferveſcence. The liquor yields muriat of ammonia, oxalat of ammonia, both in cryſtals, free muriatic and malic acid; conſequently the oxygenated muriatic acid ſeparates the uric acid into ammonia, carbonic acid, oxalic acid, and malic acid, whereby we obſerve that the oxygenated muriatic acid changes the uric acid, firſt into ammonia and malic acid, but on the addition of more acid, into oxalic acid; and when ſtill more acid is added, into water and carbonic acid. The remaining white ſubſtance is the ſame, from which the red colour originates that appears on the combination of the uric acid with nitric acid, and which imparts the cubical form to the muriat of ammonia, obtained by the evaporation of the liquor. It remains now to be ſtated what is obſerved in the diſtillation of that acid, at which it yields not only carbonat of ammonia, but alſo carbonic gas, very little oil, Pruſſic acid, partly in form of gas, partly in a fluid form, a conſiderable quantity of coal that contains no ſalt, and a little water. The productions thus obtained have the ſmell of bitter almonds. The reſults of theſe enquiries manifeſtly ſhew, that the lithic acid is really an acid of its own, conſiſting of azote, carbon, hydrogen, and oxygen. This peculiar acid is an excrementitious ſubſtance, which is carried off by the urine, and at the forming of calculi combines itſelf with a coloured animal matter, from which alſo it probably originates by a proceſs ſtill unknown.

2. *Lithat of Ammonia.* This ſubſtance ſeems to have been unknown before, or at leaſt not properly diſcerned from the uric acid, and though Scheele has obſerved it, he was ignorant of its particular nature. It is eaſily to be diſtinguiſhed by the ſmall even ſtrata in which it is formed, by its colour, that looks like milk coloured with coffee, and by its forming but ſmall calculi. It diſſolves in the lees of kali and natron like the lithic acid, but with the characteriſtic difference that it diſcharges ammonia; a phenomenon already obſerved by Scheele. It is more ſoluble in cold as well as warm water, than the lithic acid. It is in the ſame way affected by acids, except that a greater quantity is required for changing it. It is generally mixed with phoſphat of ammoniacal magneſia, becauſe it ſeems only to take place after a ſufficient quantity of ammoniacal magneſia has been formed, to ſaturate the phoſphat of kali and the free uric acid.

3. *Phoſphat of lime.* The exiſtence of this ſubſtance had hitherto been but inaccurately determined, every ſubſtance which was not lithic acid being formerly compriſed by the name of phoſphat of lime. It occurs in ſmall friable ſtrata, which break in

ſcales or ſplints of a grey white colour, and are faint, opaque, without any ſmell or taſte, and cryſtallized in a luminous or ſpar-like form; inſtead of ſtrata it is frequently compoſed of friable grains, that ſlightly cohere, and has many holes and pores like a ſpongy texture. It never forms calculi by itſelf, being, in a calculus, always united with an animal gelatinous matter; on account of which circumſtance it becomes black by expoſing it to a ſtrong heat, and burns to coal, exhaling the odour of burned bones; and yields water, oil, carbonat of ammonia, and a carbonaceous reſiduum. Being calcined white, it only leaves lime, and phoſphat of lime, without any water of cryſtallization. It is not ſoluble in cold water, but in boiling water a part of its gelatine diſſolves, ſpreading an animal odour. All acids, except the boracic and carbonic acid, diſſolve it, leaving on the bottoms of the veſſels tranſparent ſpots of animal matter. Theſe ſolutions are all precipitated by alkalis, but without any decompoſition, the precipitation remaining phoſphat of lime. On treating the phoſphat of lime with concentrated nitric acid, a thick pulpy maſs of acid ſulphat and phoſphat of lime will be obtained, on which pure alkalis, as well as carbonat of alkalis, have no effect. We never could find acid phoſphat of lime, as Brugnatelli pretends to have obſerved.

4. *Phoſphat of ammoniacal magneſia.* It conſiſts of ſcaly, half-tranſparent, hard and coherent ſtrata; can be ſawed without crumbling, and reduced to a fine ſoft and white powder. It is of a ſweetiſh inſipid taſte, ſomewhat ſoluble, and cryſtallized in rhomboids, or thick laminas, diſperſed in the cavities of other calculous ſubſtances, and it is frequently found on the ſurface of other concrement. It contains betwixt its ſtrata a gelatinous ſubſtance, but leſs than the phoſphat of lime, on which account it alſo blackens by being heated. Though it be but little ſoluble in water, yet it diſſolves in ſuch a quantity as to be capable of cryſtallizing by ſlow evaporation. Acids diſſolve it more quickly than they do the phoſphat of lime. Weak ſulphuric acid entirely diſſolves it, forming ſulphat of ammoniacal magneſia. In diluted muriatic or nitric acid, it diſappears more quickly than the phoſphat of lime. Ammonia, by which the ſalt is made turbid, only precipitates ſmall particles of magneſia. The lees of fixed alkalis diſengage from it ammonia, without forming with it a ſolution; and depriving it of the phoſphoric acid, leave the magneſia behind.

5. *Oxalat of lime.* It is, according to our obſervations, only found in the mulberry-like calculi, in combination with a coloured animal matter, and conſiſts of ſtrata covered with pointed, roundiſh, rough or ſmooth protuberances: outſide it appears of a dark or brown colour, but internally it is grey, frequently with white ſtreaks, of a ſolid texture, and may be poliſhed like ivory; it breaks in ſcales, or in the ſhape of ſhells; and, on being pounded or ſawed, it exhales an animal odour like ſemen. It is the heavieſt

of all calculous ſubſtances, and the only one which yields one-third of lime by calcination. It diſſolves with difficulty in acids, and is precipitated, unaltered, by alkalis, from nitric acid. The fixed alkalis decompoſe it when they are impregnated with carbonic acid, and when it is pulverized, and the ſolution heated, whereby carbonate of lime and oxalat of alkalis are obtained.

The great quantity of animal matter which conſtantly adheres to this oxalat of lime is very characteriſtical, which imparts the brown, reddiſh, blackiſh colour to the above kind of ſtones, and likewiſe the fine and ſolid texture. This ſubſtance may be obtained by putting ſmall pieces of theſe ſtones into diluted nitric acid, whereby it appears of the ſame colour, and becomes ſoft and ſpongy. The great hardneſs of this kind of calculi, moſt probably ariſes from the intimate connection of its particles, produced by the combination of the oxalat of lime with that animal matter, in the ſame way as lime obtains a great degree of ſolidity by its combination with albuminous matter, of which, and of a peculiar matter of urine, that animal ſubſtance ſeems to conſiſt.

6. *Siliceous earth.* Amongſt 600 calculi which we examined, there were only two that contained this earth; both had the texture of mulberry-like ſtones, though of a lighter colour, and by being calcined loſt one-third of their weight, without giving free lime; heated with acids they loſt nothing, but when melted with four times as much of alkali, they yielded ſiliceous earth, by being treated with muriatic acid. They contained phoſphat of lime, and an animal matter ſimilar to that which is united with the oxalat of lime. They were hard, difficult to be ſawed and pulveriſed, and the powder made ſcratches in metal. On being burnt they emit an animal odour; they imparted nothing to the boiling water, and to the acids a little phoſphat of lime, which difficultly ſeparates from the ſiliceous earth. Alkalis, either pure, or combined with carbonic acid, did not affect them, merely depriving them of a part of their animal matter. Their eſſential character conſiſts in their being fuſible and vitrifiable with fixed alkalis.

7. *Animal matter.* All the ſix ſubſtances juſt examined, which conſtitute the urinary ſtones of the human ſpecies, are always combined with an animal matter, as appears from its being burnt to coal, from the productions it yields by diſtillation, from its ſtench on being burnt, and from the cellulous membranous flocculi which remain when pieces of calculi are diſſolved in diluted acids. This animal matter has been frequently, and with good reaſon, conſidered as the baſis of all urinary concrements, like as in bones the gelatinous matter, the firſt baſis of the bones, forms an organic texture, in the interſtices of which the phoſphat of lime is depoſited. It is very remarkable, that the different conſtituent particles of urinary ſtones are combined with a diſſimilar animal matter, which is ſometimes albuminous, ſometimes gelatinous,

ſometimes compoſed of both, and frequently united with the matter of urine. Thus the lithic acid, or the lithat of ammonia, contains a third of albuminous matter, combined with the matter of urine, the phoſphats of earths, albuminous matter, gelatina in form of membranes, and laminas, or tela celluloſa; the oxalat of lime, a ſpongy, yet more ſolid texture of the colour of albumen, and the ſiliceous earth, a ſimilar ſubſtance. On the whole, the animal matter ſeems to unite and join together all the acid and ſaline particles of urinary concrements.

Claſſification of urinary ſtones.] The old claſſification of urinary calculi, made according to their figure and their ſize, cannot at preſent, where we have acquired ſo accurate a knowledge of their internal nature, be retained, as they ought rather to be claſſed according to their conſtituent particles; however, no regard is to be had to the animal matter, as being found in all urinary concretions, and having no influence on their reſpective difference. On comparing the reſults of the analyſes of more than 600 ſtones, we are induced to bring them under three genera; *the firſt* of which comprehends ſuch ſtones as are merely compoſed of one ſubſtance, beſides the animal matter; *the ſecond* contains urinary concretions, conſiſting of two ſtony ſubſtances, beſides the animal matter; and *the third* compriſes all thoſe which are formed by more than three calculous ſubſtances. Theſe three genera comprehend about 12 ſpecies, namely, the firſt genus three, the ſecond ſeven, and the third two; all of which we ſhall now deſcribe; but we muſt previouſly remark, that the number of the genera, as well as of the ſpecies, is only determined after the obſervations hitherto made, and may conſequently be increaſed in future.

1. *The firſt ſpecies* of urinary concretions conſiſts of lithic acid; and ſtones of this kind moſt frequently occur, as there were amongſt 600, about 150. They are eaſily diſtinguiſhed by their reddiſh or high yellow colour, much reſembling that of wood, by their brittle, radiant-like, homogeneous, and fine texture, and by their perfect ſolubility in the leys of fixed alkalis, without diſengaging the ſmell of ammonia. Their ſize varies from the bigneſs of a pea to that of a duck's egg, &c. and their figure is roundiſh, ſpheroidical, compreſſed, oval, oblong, &c. the ſurface poliſhed like marble, but frequently rough and warty; of a crimſon light red, yellowiſh, light brown colour, but never white, grey, or black; their ſtrata differ in number and thickneſs, and are frequently of a ſmooth ſurface. The ſpecific weight of theſe ſtones is from 1,276, to 1,786, but generally more than 1,500. The urinary concretions in the kidneys are moſtly of this ſpecies.

2. *The ſecond ſpecies* is compoſed of lithate of ammonia, and differs from the former by diſengaging ammonia on their being diſſolved in the leys of fixed alkalis. Concrements of this kind are generally ſmall, of a pale or grey colour, and conſiſt of fine

ſtrata, eaſily ſeparable from each other; they moſtly contain a kernel, which is eaſily ſeparated from the ſtrata that cover it.—Their figure is generally oblong, compreſſed like almonds, and of a ſmooth ſurface, which is frequently cryſtalline. Their ſpecific weight varies from 1,225 to 1,720. They are entirely ſoluble in water, particularly when previouſly pulveriſed. All acids, principally the muriatic acid, deprive them of the ammonia, leaving the pure lithic acid behind. They are frequently found covered with a thin ſtratum of lithic acid. Amongſt 600 calculi there were but few of this kind.

3. *The third ſpecies*, conſiſting of oxalat of lime, are eaſily to be diſtinguiſhed by the protuberances and inequality of their ſurface, whence they have got the appellation of mulberry-like ſtones; by their hardneſs, grey colour, ſolid texture, their poliſh like ivory, in the inſide, and their particular ſmell on being ſawed, which reſembles that of ſemen. A peculiar characteriſtic, which diſtinguiſhes them from all others, conſiſts in their leaving lime after the calcination, in their being with difficulty ſoluble in acids, and not ſoluble in alkalis, and, at laſt, in their being decompoſed by the lees of carbonats of alkali. They weigh from 1,428 to 1,976, and their ſize varies from that of a calculus renalis to the bigneſs of an egg or more; their figure is generally ſpherical or ſpheroidical. They often make the kernel of other ſtones, in which caſe they belong to another ſpecies. In 300 ſtones they bore the proportion of about $\frac{1}{4}$ or $\frac{1}{5}$.

4. *Stones of this ſpecies* contain lithic acid and phoſphat of earth, but in a ſeparate ſtate. Their ſurface is white, cretaceous, brittle, and half-tranſparent, as it either conſiſts of phoſphat of lime, or of phoſphat of ammoniacal magneſia, the kernel being formed by lithic acid; thus both conſtituents are exactly ſeparate from each other. They were found in the proportion of $\frac{1}{12}$ amongſt the ſtones that were examined by us, and they grow bigger than any of the reſt, as they appear from the ſize of an egg to that of the whole bladder, even when extended. They generally have an oval form, often pointed at one end, of a ſmooth ſurface, which, however, is frequently covered with cryſtals of phoſphat of ammoniacal magneſia. Sometimes the lithic acid in the middle is alternately covered with phoſphat of lime, and phoſphat of ammoniacal magneſia. The ſpecific weight of theſe ſtones is extremely variable.

5. *The fifth ſpecies of calculi* contains, likewiſe, lithic acid and phoſphats of earth, but intimately mixed with each other. Of theſe ſtones a great many varieties are obſerved, depending on the proportionable quantity of their conſtituent particles, as well as on the ſtrata in which they lie above one another. The chief conſtituents, the phoſphats of earth, are ſeparated in different ſtrata, but ſometimes ſo intimately mixed with each other, that it is impoſſible to diſtinguiſh them with the eye; and the analyſis could

only ſhew their difference. From this circumſtance ariſe the variety in the colour, figure, and number, of the ſtrata. The colour, however, is generally grey, but frequently variegated like marble, ſometimes like ſoap. Their figure is irregular, oval, or globular, and the ſurface moſtly brittle, cretaceous, or whitiſh, ſo as to make us believe that they only conſiſt of phoſphat of lime. The polyedrous ſtones generally belong to this ſpecies, when they have the appearance of being worn away by rubbing. They make about $\frac{1}{5}$ of the ſtones we have examined. Their ſpecific weight varies extremely, the leaſt being 1,213, the greateſt 1,739.

6. *This ſpecies* is conſtituted by lithat of ammonia and phoſphat of earth, *i. e.* of lime and ammoniacal magneſia; and reſembles in its external appearances the fourth ſpecies. One of the conſtituents, generally the lithat of ammonia, makes the kernel, while a mixture of the two others, but rarely one by itſelf, forms the cruſt. Sometimes, however, the kernel contains alſo the phoſphats, and the cruſt a little lithat of ammonia, which, even in ſome varieties, is mixed with pure lithic acid. The ſtrata in ſtones of this kind are more eaſily ſeparable, and always ſmaller than thoſe of the fourth ſpecies. Their ſpecific weight is 1,312 to 1,761; and they are more rarely met with than moſt of the reſt. Amongſt 600 there were only 20 of this kind.

7. Stones of the *ſeventh ſpecies* conſiſt likewiſe of lithat of ammonia and phoſphat of earths, but intimately mixed with each other. They are of a paler colour, much lighter than the fifth ſpecies, and diſengage a great deal of ammonia on their being treated with kali. We found them only in the proportion of $\frac{1}{40}$, amongſt the ſtones which we have analyſed. They never grow ſo large as the two former.

8. The conſtituent particles of the *eighth ſpecies* are phoſphat of lime and phoſphat of ammoniacal magneſia. The pure white colour, the friability, their being inſoluble in alkalis, and their eaſy ſolubility even in weak acids, conſtitute the chief characteriſtics of this ſort of ſtones, of which we found about 60 amongſt 600: Sometimes they are of an enormous ſize, of irregular form, rarely round, but frequently of an uneven ſurface, and reſembling an incruſtation. Their texture is formed of white brittle ſtrata, ſometimes interwoven with ſolid half-tranſparent cryſtals of ammoniacal magneſia. The cruſts formed on foreign bodies that happened to penetrate into the bladder, belong to this ſpecies; the ſpecific weight of which is 1,138 to 1,473.

9. This ſpecies of ſtones contain oxalat of lime, but externally uric acid, in more or leſs quantity, and are only to be diſtinguiſhed by the kernel from the firſt ſpecies. The proportion of both conſtituents, and the ſpecific weight, vary extremely, the latter being 1,341 to 1,754. Sometimes the kernel, conſiſting of oxalat of lime, is only covered on one ſide with uric acid, and diſcernible on

the other by the protuberances with which the ſurface is variegated; which variety, however, ſeldom occurs.

10. Stones of this ſpecies have, in their centre, oxalat of lime, ſurrounded by phoſphat of earths; the kernel is grey or brown and radiant-like, the cruſt white and cretaceous; their ſize and figure differ extremely, and their ſpecific weight is from 1,168 to 1,752. They amount to $\frac{1}{5}$ of the ſtones we have examined.

11. This ſpecies contains ſtones compoſed of three or four calculous ſubſtances, namely, of oxalat of kali, phoſphat of earths, and of uric acid, either pure or combined with ammonia. They rarely occur; and amongſt 600 ſtones we only obſerved ten or twelve. They often conſiſt of three diſtinct ſtrata, viz. In the interior, of oxalat of lime; in the middle, of lithat of ammonia; and the exterior, of phoſphats of earth, which are frequently mixed with uric acid, or lithat of ammonia, all which are diſtinguiſhed on their being ſawed through. This ſpecies comprehends three varieties; the firſt of which conſiſts of oxalat of lime, uric acid, and phoſphats of earth; the ſecond contains lithat of ammonia, combined with pure uric acid, and the two other conſtituents; the third has, beſides theſe two ſubſtances, free uric acid and lithat of ammonia, mixed with the phoſphats of earth. We forbear to mention other varieties of this ſpecies, as being leſs remarkable and inſtructive.

12. The laſt ſpecies of calculus is of a very complicated compoſition. The ſiliceous earth ſeems to have taken the place of the oxalat of lime; it is mixed with uric acid and lithat of ammonia, and covered by phoſphats of earth. Stones of this kind are the rareſt of all, and there were only *two* amongſt 600.

Cauſes of the generation of urinary calculi.] To enquire into the cauſes by which urinary concretions are produced, is both intereſting and uſeful, however attended with the greateſt difficulties. The writings of medical authors are full of conjectures and hypotheſes with regard to this ſubject, on which nothing could be aſcertained before we had acquired an accurate knowledge of the nature of urinary concretions. It is owing to this circumſtance that the moſt enlightened phyſicians acquieſced in aſcribing the immediate cauſe of them to a ſuperabundance of terreous matter in the urine; and Boerhaave, as well as, particularly, Van Swieten, imagined that the urine of all men contained calculous matter in the natural ſtate, and that for the generation of ſtones a kernel was only required, to attract it. That this may be the caſe, in ſome inſtances, is proved by frequent experience; but ſtones produced by foreign bodies, that have accidentally got into the urethra or bladder, are always white and compoſed of phoſphat of earths, and ſeldom or never covered with lithic acid, a ſubſtance which is obſerved to form the ſtones that moſt frequently occur; but even in theſe the kernel conſiſts of a ſubſtance formed in the body itſelf, as a grain deſcended from the kidneys, &c. which muſt, therefore, have neceſſarily originated in a peculiar internal cauſe. A ſuperabundance of uric acid in ſtony patients, and its more copious generation than in a ſound ſtate, though it ſeems to be one of the principal and moſt certain cauſes, is by no means ſatisfactory, as it only explains the precipitation of ſtony matter from the urine, but not why it unites in ſtrata. A coagulating ſubſtance is required for ſeparating, attracting, and, as it were, agglutinating the condenſible particles that are precipitated. This ſubſtance is undoubtedly the animal matter which we have conſtantly found in all calculous maſſes, and which ſeems to conſtitute the baſis of ſtones, like the membranous gelatina that of bones. It is known that the urine of calculous patients is generally muddy, ductile, in threads, ſlimy, and as if mixed with albumen, which quality it obtains at the moment when the ammonia is diſengaged, or on the addition of kali that ſeparates it from the acid in which it was diſſolved; and in all caſes of ſuperabundance of lithic acid the urine contains a great quantity of that animal matter, which promotes the precipitation of it, and attracts and unites the particles thus ſeparated.—Hence it appears, that every thing capable of increaſing the quantity of that pituitous gluten in the urine, may be conſidered as the remote cauſe of calculous formations. And the old ideas on pituitous temperaments, or ſuperabundant pituita, &c. which were thought to diſpoſe people to the calculus, ſeems to be connected with the late diſcoveries on the nature of urinary ſtones. Though the animal matter appears to be different in different calculi, yet it is certain, that every calculous ſubſtance contains an animal gluten from which its concrete and ſolid ſtate ariſes; whence we may fairly ſtate the ſuperabundance of that ſubſtance as the chief and principal cauſe of calculous formation.

There are, however, other cauſes which ſeem to have a particular influence on the nature of urinary ſtones and the ſtrata in which they are formed; but it is extremely difficult to penetrate and to explain them. We are, for inſtance, entirely ignorant of the manner in which urinary ſtones are formed from the oxalat of lime; though from their occurring more frequently in children than in adults, we might be entitled to aſcribe them to a diſpoſition to acor, a cauſe conſidered by Boerhaave as the general ſource of a great number of diſeaſes incident to the infantile age. This opinion ſeems to be proved by the ideas of Bonhomme, phyſician at Avignon, on the oxalic or ſaccharic acid, as the cauſe of mollities oſſium in the rickets; by this acid being diſcovered in a ſpecies of ſaliva by Brugnatelli; and, laſtly, by an obſervation of Turgais, who found this acid in the urine of a child diſeaſed with worms. We but rarely obſerve ſaccharic acid in the human body, which appears to be moſtly adventitious, and by which the animal matter is rendered coagulable, and depoſited or precipitated with the oxalat of lime; or the oxalic acid decompoſes the phoſphat of lime, and forms an inſoluble combination incapable of being any longer kept diſſolved in the urine, It is, however, extremely difficult to determine how far the conſtitution of the body is connected with that particular diſpoſition in the urine, of precipitating ſometimes phoſphat of lime mixed with oxalat of lime, ſometimes phoſphat of ammoniacal magneſia, either by itſelf or mixed with lithic acid, &c. &c. Who can explain the reaſon, why of 600 ſtones there were only two in which ſiliceous earth could be traced? Still more difficult it is to explain the cauſes why the above ſubſtances precipitate either at once or in different ſtrata; but it may ſuffice to have ſhewn how many obſervations and experiments are required, and what accurate attention and perſeverance are neceſſary in order to throw light on ſo difficult a ſubject. We are only enabled to obtain ſatisfactory explanations concerning thoſe queſtions by an accurate chemical analyſis of the urine of calculous patients in different years of their age; an undertaking which, however difficult, has enriched us with ſome intereſting and ſucceſsful reſults, but which would be an enquiry too extenſive to be properly undertaken in a practical work.

SECT. II. *Of* STONE *in the* BLADDER.

A variety of cauſes have been aſſigned as tending to the formation of calculi in the bladder; as we have juſt now ſeen. After a calculus has begun to be formed, it ſometimes acquires a great ſize in a few months from the firſt obvious ſymptoms; but ſometimes it remains in the bladder for many years without arriving at any conſiderable ſize. We ſhall now, under diſtinct heads, ſpeak of the ſymptoms, modes of treatment, &c. common in ſuch caſes.

Symptoms of Stone in the Bladder.] The ſymptoms commonly come on gradually, and bear ſome kind of proportion to the ſize and inequalities of the ſtone. One of the firſt commonly taken notice of, is an uneaſy ſenſation at the point of the urethra, which for ſome time is perceptible only upon making water, or upon uſing violent or jolting exerciſe. This ſenſation gradually increaſes; and there is alſo a frequent deſire to make water, which is commonly voided in ſmall quantities, and ſometimes only in drops. When running in a full ſtream, it often ſuddenly ſtops, though the patient is conſcious that a conſiderable quantity ſtill remains, and feels a ſtrong inclination to void it. If the ſtone be large, the patient has a conſtant dull pain about the neck of the bladder, and frequent deſire of going to ſtool. The urine is generally of a limpid colour; but it is frequently thick, depoſiting a mucous ſediment, and when the diſeaſe is violent, it is often tinged with blood. All theſe complaints are greatly increaſed by exerciſe, eſpecially by riding on horſeback; and from a long continuance of pain, the patient's health by degrees becomes much impaired, and unleſs effectual means are employed for removing the cauſe of the diſorder, death alone puts an end to his miſery.

We are rendered certain of the exiſtence of calculus when ſmall pieces of ſtone are frequently paſſed along with the urine. When this does not occur, we cannot be certain that the ſymptoms do not ariſe from an ulcer or tumor in the body or neck of the bladder, or from the preſſure of tumors in the neighbouring parts. In doubtful caſes, however, we have one mark by which we can judge with certainty, and that is by means of ſounding.

Method of ſounding.] This is performed by introducing an inſtrument called a *ſound* (Plate III. fig. 65), formed of ſteel, finely poliſhed, and having the natural curvature of the urethra. The patient is to be laid upon a table or acroſs a bed, with his ſhoulders raiſed upon a pillow, to bring the ſtone to the neck of the bladder, and his thighs a little elevated and ſeparated from each other. A ſound adapted to the ſize of the urethra is to be choſen; and previous to the introduction it is to be laid in warm water till it be of the heat of the body, and then wiped, and rubbed over with bland oil, butter, or axunge. The ſurgeon lays hold of the penis with his left hand, while with his right he introduces the ſound with its concave ſide towards the abdomen. He is now with his left hand to draw the penis gently forward upon the inſtrument, which is to be gradually puſhed into the bladder. If any difficulty occur about the neck of the bladder, this may be obviated by introducing the finger into the anus, and raiſing the point of the inſtrument; or the ſame purpoſe is more readily anſwered by depreſſing the handle of the ſound. If ſtill it does not paſs with eaſe, much force ought by no means to be uſed, leſt the inſtrument perforate the membranous part of the urethra.

As ſoon as the inſtrument enters the bladder, if it happen at once to touch the ſtone, a tremulous motion will be communicated to the fingers of the operator, and the buſineſs of ſounding is then accompliſhed, the nature of the diſeaſe being now aſcertained. Great care, however, is here always neceſſary, as a few particles of ſand, or a hardened ſtate of the bladder, have ſometimes communicated the ſame ſenſation. If the ſtone be not ſoon diſcovered, the inſtrument is to be moved in all directions; and ſhould the operator be ſtill unſucceſsful, one of the fingers of the left hand is to be introduced into the rectum, ſo as to raiſe that part of the bladder in which a ſtone may probably be concealed. If even this attempt prove ineffectual, the body of the patient is to be put into different poſitions, and perhaps one of the beſt is depreſſing the ſhoulders and raiſing the pelvis. By this means a ſtone may generally be felt, provided it is not contained in a cyſt, which very rarely happens. If after all theſe different attempts the ſurgeon ſhould fail in diſcovering the ſtone, the inſtrument is to be withdrawn; and if ſymptoms of ſtone be ſtrongly marked, and it appear that neither ſcirrhus nor inflammation, which might give riſe to theſe ſymptoms, exiſt, a ſecond or even a third trial is to be made on the following days.

Lithontriptics.] Various lithontriptics have been recommended for diſſolving the ſtone in the bladder; ſuch as lime-water, cauſtic alkali, ſoap, &c. but none of them can be conveyed in ſuch a ſtate into the bladder as to be much depended upon, as they undergo the greateſt change in the courſe of the circulation. To obviate theſe changes, it has been recommended to inject certain fluids of this claſs through the urethra into the bladder: but this has not been attended with any material advantages, and has generally been found to do injury to the bladder.

Profeſſor Maſcagni of Siena, relates, in a letter to Dr. Gauturi, ſome obſervations on urinary ſtones and gravel. The efficacy of alkalis upon them, he ſays, ſeems to conſiſt in neutralizing the lithic acid, and by that means forming neutral ſalts, which diſſolve eaſier in water than the acid itſelf. The urine of perſons affected with the ſtone, always ſhews evident traces of lithic acid, whenever the ſymptoms of the ſtone are increaſing. With this view, a ſolution of pure kali is ſometimes ſucceſsfully employed in complaints occaſioned by the ſtone or gravel. But as the pure kali has the inconvenience of ſometimes affecting the ſtomach and bowels by its corroſiveneſs, the profeſſor was curious to know whether the carbonat of potaſh would have the ſame effect, though he was conſcious of its not acting upon ſtony concretions out of the body, which are eaſily diſſolved in pure kali, with which the lithic acid forms a neutral ſalt; whereas it ſeems not ſo nearly related with the potaſh, as to diſengage the carbonic acid. However, being himſelf ſubject to affections of gravel, Prof. *Maſcagni* began to take the carbonat of potaſh, and found it very efficacious in preventing the formation of the gravel; and during the time it was uſed, the traces of lithic acid entirely diſappeared, but the ſymptoms increaſed when it was for ſome time left off. —In the urine a fine ſaline ſubſtance was diſcovered, that eaſily diſſolved in warm water. By the continuance of the alkali, the urine ſeemed to become ſuperſaturated with it, and yellow vegetable colours were changed into red by it. Theſe experiments ſeemed to prove, that the common kali penetrates to the urinary ſyſtem, and prevents, by its combination with the lithic acid, the formation of calculus and gravel, and it is not improbable that it likewiſe acts as a lithontriptic; but this is to be aſcertained by further experiments. The carbonic acid is very probably diſengaged from the potaſh in the way of digeſtion and chylification, by which the latter is enabled to act upon the lithic acid.

Pure potaſh may be given to one drachm diſſolved in two pounds of water, which portion is to be taken in one day. The doſe of the carbonate of potaſh is three drachms per day. Its continued uſe does not ſeem to have any bad effect upon the organs of digeſtion. Profeſſor Hufeland, in whoſe Practical Journal this letter is publiſhed, remarks, that his own obſervations perfectly agree with the above experiments, and he always found alkalis, mineral as well as vegetable, do much good in calculous affections; and on this account the waters of *Carlſbad* in Bohemia, prove extremely efficacious againſt them, as they contain a conſiderable portion of mineral alkali. He frequently ſaw by the uſe of it, *calculous* ſubſtances become *ſabulous*. There is a remedy celebrated in Holland particularly, under the name of *liquor lithontripticus Looſii*, which contains, according to an accurate chemical analyſis, *calx muriata*.

Profeſſor Hufeland recommends it in the following form:

(No. 86.) ℞ Calcis muriat. drach. j.
Aquæ diſtillatæ ℥ij. Fiat Solutio.

Thirty drops to be taken four times a-day, which doſe may be increaſed, as far as the ſtomach can bear it.

Calculus in the urinary bladder, has in ſome inſtances been ſucceſsfully treated by giving water impregnated with fixed air, by means of alkali and vitriolic acid, to which the name of *aërated alkaline water* has been given. A caſe in which this remedy was employed is related by Mr. Harriſon, in the Memoirs of the Medical Society of London.

" Mr. John Hobman, of Epſom, late Dantzick merchant, was the ſubject of this caſe. He was a well-made ſtrong man, of an excellent conſtitution, and before this complaint could walk ten or twelve miles a-day with great eaſe to himſelf, though at the advanced age of ſeventy-four or five years.

" He had been afflicted," ſays Mr. Harriſon, " with calculous ſymptoms about two years, as nearly as I can remember, before I was conſulted; and was ſo fully convinced in his own mind of having a ſtone, that he uſed to expreſs himſelf by ſaying, 'That he felt the weight of it preſſing on the neck of the bladder.'

" He never had a ſevere fit till the month of January, 1779, when he was ſeized with a ſuppreſſion of urine, to relieve which I was obliged to paſs the catheter, in order to draw off his water.

" The inſtrument ſtruck againſt the ſtone in ſo remarkable a manner as to affect both the ear and the touch very ſingularly, and rather ſurpriſed me, notwithſtanding I had been previouſly acquainted by him that there was certainly a ſtone in the bladder. Its magnitude I ſuppoſed to have been, from the ſound and touch, about the ſize of a ſmall pullet's egg, and rather globular. A few days afterwards, I was obliged to introduce the catheter again to bring away the water, and found the ſtone preſſing on the neck of the bladder, which receded the moment that the inſtrument touched it, and then a quantity of paliſh urine ran freely off.

"From the almoſt continual irritation of the ſtone, and Mr. Hobman's advanced age, his caſe was by ſome deemed fatal.—Nevertheleſs, having paid great attention to him, I was of a different opinion; apprehending from his native ſtrength, that he had *ſtamina* equal to ſupport him ſome years longer; a ſufficient reaſon, I thought, to juſtify the trial of ſome lithontriptic medicine.

"With this view I propoſed a *lixivium* to be given, as prepared by Mr. Lane, an ingenious apothecary in Alderſgate-ſtreet. The phyſician who was conſulted, preferred the uſe of water impregnated with fixed air, by means of ſalt of tartar, and weak ſpirit of vitriol, as recommended by Dr. Hulme in a treatiſe publiſhed in the year 1778, entitled, 'A ſafe and eaſy Remedy propoſed for the Relief of the Stone and Gravel, the Scurvy, Gout, &c.' but with which I was not at that time acquainted.

"This *lithontriptic medicine* was given twice a-day, and after our patient had taken it about ſeven or eight weeks, to the beſt of my recollection, he was ſuddenly relieved one evening, by a large diſcharge of cretaceous, or rather ſtony matter in the urine, without any pain or inconvenience. It ran from him during the greater part of the night involuntarily, while he was aſleep, as well as when he was awake. It ſoaked through the bed, and ſacking of the bedſtead, and ran upon the floor, ſtaining it with a whitiſh grey hue, or rather with the colour of free-ſtone. The powder left behind upon the floor, and in the chamber-pot, was almoſt as fine as if it had been levigated. He never obſerved any calculous matter to be voided in his urine before the uſe of this medicine, and the whole of it was diſcharged in the ſpace of five or ſix days.

"From this time all ſymptoms of a ſtone in the bladder diſappeared, and he recovered his ſtrength much quicker than people in general do at his time of life; but was not able to walk ſo well afterwards as before; the fit ſeemed to have weakened his feet. I adviſed him to perſevere in the uſe of the lithontriptic, leſt ſome fragment of the calculus might remain, which he did for two or three months longer.

"In January, 1781, he complained of coſtiveneſs and piles, and that his urine did not paſs ſo freely as before, but rather with a contracted ſtream. Some lenitive electuary with *ſulph. præcipit.* were preſcribed; and I recommended him to uſe the medicine of Dr. Hulme again, but could not prevail upon him. By means of the above electuary, and *ol. ricin.* he ſeemed to be relieved. During the year 1782 he took but very little medicine, and his complaints were generally as laſt mentioned.

"In 1783, beſides an habitual coſtiveneſs, he was frequently ſeized with an hæmorrhoidal flux while at ſtool, and voided at different times large quantities of blood. Theſe were attended with a frequent *teneſmus*, and retention of urine; which induced me to think that ſome part of the ſtone remained ſtill undiſſolved, and therefore I once more entreated him to begin with the lithontriptic, but in vain.

"On the 28th of October, 1784, his complaints becoming almoſt inſupportable, he ſent for me, and I adviſed the immediate uſe of an emollient *enema* to be thrown up twice a-day, with a view to foment the parts, and empty the inteſtines.

29th. "He could at this time hardly paſs any urine; but by throwing up an *enema*, it enabled him by dribblets to make about a pint.

30th. "By ſitting over the ſteam of hot water, put into a cloſeſtool-pan and frequently renewed, for the ſpace of an hour, his urine dripped ſlowly away, but he paſſed a very indifferent night.

31ſt. "This day there was almoſt a total ſuppreſſion of urine; but he had three ſtools without aſſiſtance.

November 1. "He informed me that he had made a little urine in the night; but that it was evacuated with the greateſt difficulty. On examination, I found that there was an enlargement of the proſtate gland. An emollient injection was adminiſtered in the evening, and an anodyne draught was given at bed-time.

2d. "In the evening he had a total ſuppreſſion of urine; and an *enema* was thrown up, which procured him three or four ſtools.

3d. "About four o'clock in the morning I was called to him; and on my arrival informed that he could paſs no urine. As ſoon as a warm bath could be prepared, he was put into it, and in a few minutes after he had been immerſed, he voided about a pint of water. When he came out of the bath he was put into a warm bed, and a cardiac anodyne draught was given, which procured him four hours' good ſleep. When he awoke, he made more water. An emulſion of *ol. ricin.* was occaſionally adminiſtered, which kept the body gently open.

4th. "A difficulty of urine continuing, I endeavoured to paſs the catheter, as the frequent uſe of the warm bath occaſioned faintneſs, but was prevented by a ſtricture in the *urethra*.

5th. "His urine came away of itſelf, ſo as to occaſion no further uneaſineſs, a general atony now prevailed, and he was attacked with a violent *diarrhœa*.

6th. "From this day to the 12th (on which he expired) he daily grew worſe, and the *diarrhœa* reſiſted every effort made uſe of to check or ſuppreſs it."

After his death, it was found on inſpecting the body, that the bladder contained about a quart of water, but not the leaſt calculous concretion in it. Its coats were rather thinner and ſofter than uſual, and the innermoſt one had put on a dark gangrenous appearance. The neck of the bladder was much inflamed, particularly on its external part; and alſo the whole length of the *rectum.* The kidneys were ſound, and without any ſtone or gravel. The ureters were ſomewhat enlarged. In the *urethra* was found a ſtricture, ſeemingly cauſed by inflammation, and the preſſure of the proſtate gland, which was indurated and enlarged. All the other *viſcera* were perfectly ſound.

This remedy, however, was employed, with others, without any permanent good effect, in the following inſtance, which is related by Mr. Errat in the ſame work.

" Mr. Thomas D——, of G——, in the county of Norfolk, whoſe ſufferings ended in death, on the 3d of November, 1794, at the age of twenty-ſeven, had, from childhood, experienced ſymptoms which uſually accompany a ſtone in the bladder. Theſe gradually increaſed in violence, and at length became ſo intolerable as to induce him to apply for advice to an eminent ſurgeon, whoſe practice in ſtone caſes was very conſiderable. He was under this gentleman's care for ſome time, and was repeatedly examined; the reſult of which was almoſt a conviction that there was no ſtone in the bladder. He was put upon a courſe of mercurials and cicuta; uſed bougies, and took medicines, without any benefit. Upon taking leave, he was requeſted to try the effect of the *aërated alkaline water.* With this he complied, and, in the courſe of a few weeks, derived evident advantage from its uſe. By degrees all his painful ſymptoms left him, the bladder ſuffered its natural accumulation of urine to take place without any painful ſenſation, and diſcharged its contents free from difficulty or interruption. In this happy ſtate he continued near four years, taking occaſionally the ſaturated water; and, in purſuit of his favourite field amuſements of hunting and ſhooting, he often underwent the greateſt bodily fatigue without inconvenience. It was not until the harveſt of 1793 that the ſymptoms recommenced, on his becoming very wet while in a ſweat. From that period to the beginning of the February following, he was under the care of a medical friend of mine, from whom he experienced ſome relief. It was at this time my firſt attendance on him commenced, and opportunities occurred to me of marking particularly the ſymptoms and progreſs of the diſeaſe. His ſtrength was much reduced, appetite extremely bad, body coſtive; he was alſo troubled with teneſmus, and an almoſt conſtant inclination to make water, which he paſſed in ſmall quantities with intolerable pain. His urine was thick when made, very fetid, and depoſited a ſediment of a purulent appearance. The four years' perfect freedom from any of theſe ſymptoms, or any inconvenience ariſing from the ſtrongeſt exerciſe; the probable concluſion that might be drawn from the examinations of a ſurgeon much in the habit of ſounding patients for the ſtone; and the ſubſequent intervals of eaſe, returning ſtrength, and perfection of the ordinary functions of the bladder; were, in my opinion, ſtrong circumſtances againſt the preſence either of a ſtone, cancer, or of any organic affection. With theſe impreſſions on my mind, the preſent caſe ſtruck me as an inſtance of a local morbid irritability; and, recollecting Mr. Cline's recommending the tinct. ferri muriati, in partial ſpaſm, I gave the preference to this tonic, and exhibited it in doſes of ten drops, three times a-day, enjoining its increaſe as the ſtomach would bear it: to which I added a draught containing a drachm of ſp. æther. vitriol. five-and-twenty drops of tinct. opii, forty of tinct. caſtor. with pennyroyal water, every night at bed-time; and ſome laxative pills, with pilul. ex aloe cum myrrha; containing alſo pil. e gummi, camph. et caſtor, before each doſe of the drops. The apparent effects of this plan were, conſiderably better nights, a rapid return of appetite and ſtrength, a total ceſſation of pain, regular ſtate of the bowels, a retention of the urine in its natural quantity, without any obſtruction in diſcharging it. This flattering change continued to increaſe our hopes of a perfect recovery for three weeks, during which period, notwithſtanding the abſence of the ſymptoms, the medicines were regularly continued. We found ourſelves, however, too ſanguine, for now a degree of uneaſineſs about the region of the kidneys, and in the bladder, attended with a ſenſe of heat in theſe parts, came on; the appetite gradually fell off; ſome catarrhal affections (which we afterwards obſerved generally preceded the violence of the paroxyſms) were likewiſe preſent, and the whole train of ſymptoms already mentioned, followed. In ſo critical a ſituation I did not chooſe to truſt entirely to my own judgment, and a phyſician was called in. He preſcribed ſuch a plan of treatment as was likely to leſſen the morbid irritability of the bladder, procure eaſe, and ſupport the powers of the conſtitution, which, from the ſeverity and repetition of the attacks, were evidently declining. At the end of about a month the violence of the ſymptoms began again to abate, the appetite returned, and he rapidly recovered. Scarcely, however, had a fortnight elapſed, before a freſh attack took place: which was longer in duration, and accompanied by greater debility, loſs of appetite, ſtrength, and fleſh, than either of the preceding. The ſurgeon who was originally conſulted, and had ſearched him for the ſtone, was now ſent for. He concurred in the opinion we had formed; but, having upon examination felt through the integuments a hard body juſt riſing above the pubes, it was concluded that a thickening of the coats of the bladder had taken place in conſequence of inflammation. The plan we were purſuing was therefore changed, and emollient and cooling medicines were ſubſtituted. Theſe were adminiſtered two or three days; the ſtrength ſunk very faſt, and the pain, if poſſible, grew more urgent, ſo as to induce us again to have recourſe to the former medicines. He ſoon got better, and enjoyed a longer interval than hitherto from his ſymptoms; but the abſence of theſe was not ſo complete, for during this time (which was about three months) he felt occaſionally ſome pain, and his urine was never perfectly free from a ſediment, in which there was two or three times the appearance of grumous blood. His appetite, however, was remarkably good, he grew fat, and was ſo well, that he performed a journey of thirty miles in an open chaiſe, to pay a viſit to his brother, at whoſe houſe he ſtayed a month or five weeks, and returned to G—— by the ſame conveyance, without ſuffering any pain or inconvenience.

"From this period he had two ſevere paroxyſms previouſly to his diſſolution; the laſt of which took place in the beginning of October. The ſymptoms were much the ſame as on former attacks, excepting only that the powers of the conſtitution daily became more exhauſted, and at length, after a very ſevere ſtruggle, ſunk under the conflict. On this laſt attack another diſtinguiſhed phyſician was conſulted; but, as all that was done was done under an erroneous notion of the true cauſe of the diſeaſe, it would be ſuperfluous to give a particular detail of the treatment. I ought not, however," ſays Mr. Errat, "to omit mentioning one circumſtance; that, during this phyſician's viſit, the bottom of the body, where the hardneſs ſpoken of before was diſcovered, was carefully examined, but nothing of the kind could now be felt. I recollect on the firſt examination he was lying on the ſofa in an horizontal poſition, he now ſtood in an erect one. Afterwards (the day before he died) it was again diſtinctly felt through the integuments, as he lay in bed."

The following were the appearances on diſſection:

"The left kidney adhered to the ſpleen by its external membranous covering, which was very much thickened and diſeaſed. The whole of the kidney bore marks of diſeaſe; it was conſiderably enlarged, and filled with ſmall circumſcribed abſceſſes or veſiculæ containing thick pus, ſome of which were of the ſize of a nutmeg, and had orifices of communication with the infundibula and pelvis. Theſe latter were dilated to twice their natural capacity, and the ureter was ſo large as to admit the end of the forefinger.

"The appearances in the right kidney were ſimilar to thoſe already deſcribed in the left.

"The fundus of the bladder was found projecting about half an inch beyond the oſſa pubis, tightly embracing a hard body.

"On cutting into the cavity of the bladder, this hard body proved to be an oval compact ſtone, irregularly covered with a ſoft chalky ſubſtance.

"Its weight was nearly two ounces and three quarters. Near that extremity of the ſtone which was immediately in contact with the fundus of the bladder, there was a ſmall pointed irregularity, or projection, about the ſize of a pin's head, which correſponded with an impreſſion, or rather ulceration, in this part of the bladder juſt large enough to receive it. Around this ſmall ulceration there was a circle about the circumference of a ſhilling, having the appearance of recent inflammation.

"The coats of the bladder were conſiderably thickened, and that portion which immediately embraced the ſtone, forming the fundus, was ſo indurated and diſeaſed, as to be, I ſhould imagine, incapable of dilatation.

"That ſpace towards the neck of the bladder unoccupied by the ſtone (the coats being here in a much leſs diſeaſed, and more dilatable, ſtate) contained an ounce or two of urine, loaded with pus, which ſeemed to iſſue from the mouths of the ureters."

Natural cure.] In the third volume of the Memoirs of the Medical Society of London, a very curious caſe is related of a ſtone which releaſed itſelf from the bladder by paſſing through the rectum. Dr. Johnſtone, of Worceſter, who relates it, deſcribes the patient to have, for many years, ſuffered the moſt excruciating pains from gravel and ſtones in the bladder; for which he received no relief, but rather aggravation of pain, from the uſe of the moſt celebrated lithontriptics. Nor did even the largeſt doſes of opium, whether taken into the ſtomach, or conveyed by clyſter, hardly give him any reſpite from pain.

"Some years paſſed in this torture," ſays Dr. Johnſtone: "he began at length, in ſearching his ſtools, to find pieces of gravel voided with them. I ſaw ſome of theſe pieces, and was perfectly convinced by their appearance, that they had come from the bladder, and had forced their paſſage through it and the rectum. Tincture of opium was daily injected in oily clyſters to quiet the pain, till theſe pieces of gravel came away in his ſtools; and he has ever ſince been free from the pains which had tormented him for ſo long a time.

"This kind of *natural lithotomy*, if I may ſo expreſs myſelf, is, I believe, not very common; but no one who ſaw this patient in the leaſt doubted that the ſtones, which had given ſuch pain in the bladder, had cut their way through the bladder and rectum, and, being diſcharged with the ſtools, the wound through which they paſſed had perfectly healed; for he is now a very healthy and vigorous old man."

Lithotomy.] The only effectual method of removing ſtones from the bladder is by means of a chirurgical operation; the ſucceſs of which depends much upon the dexterity of the ſurgeon, as well as on the conſtitution of the patient. When the conſtitution has been ſo much impaired that the patient complains greatly of ſickneſs and oppreſſion at ſtomach, with nauſea and an inclination to vomit, eſpecially upon taking food; when he has likewiſe a conſtant thirſt, and the pulſe is as high as a hundred ſtrokes in the minute; an operation is improper till theſe ſymptoms are removed. The operation is improper alſo when the patient labours under a ſevere fit of the ſtone; for then inflammation of the bladder is apt to enſue to ſuch a degree as to produce ſuppuration. By frequent attacks and continuance of theſe fits, the coats of the bladder are apt to be thickened and greatly contracted. This laſt circumſtance may be known by the introduction of the ſound; for then it will ſtop after getting paſt the ſphincter of the bladder, and cannot be puſhed further without conſiderable force, and at the ſame time giving the patient the moſt exquiſite pain. Nor ought the operation to be performed when the bladder is ulcerated, eſpecially where the patient is old, and much debilitated, and where the diſcharge of matter is great.

Children more readily recover from the operation of lithotomy than adults; and old people from the age of fifty-five to that of ſeventy, whoſe conſtitutions have not been broken, are in leſs danger than thoſe in the full vigour of life, probably owing to inflammatory ſymptoms being more apt to proceed to a dangerous length in the extremes of age than at the middle period of life. When the conſtitution, however, is not much impaired by the continuance of the diſeaſe, the operation may be undertaken with a probable degree of ſucceſs almoſt at any period of the patient's life.

Several methods have been recommended for performing this operation; but there are only two which can be practiſed with any propriety. One is, where the operation is to be performed immediately above the pubes, in that part of the bladder which is not covered with peritonæum: the other, where it is done in the perinæum, by laying open the neck and lateral part of the bladder, ſo as to allow of the extraction of the ſtone.

High operation.] Franco, a French ſurgeon, finding a ſtone in a child of two years of age too large to be extracted through an opening in perinæo (the place where the operation was then perfomed), was induced to make an inciſion into the bladder above the pubes; but though the ſtone was extracted and the child recovered, Franco, who publiſhed the caſe in 1561, never attempted the operation again, and even diſſuades others from doing it. It does not appear indeed to have been much practiſed any-where till ſome time after the commencement of the preſent century, about the year 1720, when it was adopted and frequently performed in Britain, and other parts of Europe, for the ſpace of about twelve or fifteen years. The lateral operation came then to be more generally known, and ſince this period the high operation has been ſeldom practiſed.

In performing the high operation, the bladder muſt be in a diſtended ſtate, ſo as to make it riſe above the oſſa pubis, to allow an inciſion to be made into that part of it which is uncovered by the peritonæum, and thereby to prevent the abdomen from being opened or its contents expoſed. Some days, or even weeks, previous to the operation, the patient ought to be deſired to retain his urine as long as he can, ſo as to diſtend the bladder till it can hold at leaſt a pound and a half, when the perſon is an adult, and of an ordinary ſize; or the penis may be tied up to allow the urine to collect. As theſe methods may be attended with great diſtreſs, ſome prefer diſtending the bladder by injecting warm water by ſlow degrees till the bladder is ſufficiently full, which may be eaſily known by relaxing the abdominal muſcles and feeling above the pubes.

When the operation is to be performed, the patient is to be laid upon a table of convenient height, with the pelvis higher than the ſhoulders, that the parts may be fully on the ſtretch, and to prevent the bowels from preſſing upon the bladder. The legs and arms are to be properly held by aſſiſtants. An inciſion is to be made through the ſkin, in the very middle of the under and fore part of the abdomen, from ſome way under the umbilicus to the ſymphiſis pubis. The cellular ſubſtance, the tendon of the oblique muſcles, the muſculi recti and pyramidales, are now to be ſeparated; and it is better to make this ſeparation from the pubes upwards, ſo as to be in no danger of cutting into the abdomen. The ſurface of the bladder will now appear uncovered by the peritonæum. Then the operator, with a common ſcalpel, or an abſceſs lancet, or, what is better, with a concave ſharp-pointed knife, makes a perforation into the moſt prominent part of the bladder, till the fore-finger of the left hand can be introduced. The ligature is now to be removed from the penis; then with a probe-pointed biſtoury, making the finger ſerve as a conductor, the wound is to be made ſufficiently large for the extraction of the calculus, taking particular care, however, not to carry the inciſion ſo high as to cut the peritonæum. This part of the operation being finiſhed, the ſtone is to be extracted with the finger; or if that be impracticable, the forceps are to be employed. Should it unfortunately happen that the ſtone is broken in the extraction, the pieces are to be removed entirely by the fingers rather than by ſcoops, which are ſometimes uſed. The edges of the wound in the integuments are now to be drawn together by means of the twiſted ſuture, leaving about an inch and a half immediately above the pubes for the diſcharge of any urine which may be there evacuated. The patient is to be laid in bed, with the pelvis ſtill kept higher than the ſhoulders.—Gentle laxatives are to be occaſionally given, and the antiphlogiſtic plan ſtrictly adhered to.

The advantages of this method are, that larger ſtones can be extracted by this than by the lateral operation, and that fiſtulous ſores are leſs apt to enſue. The diſadvantages are, the danger of opening or wounding the peritonæum, and thereby expoſing the abdominal bowels; the frequent occurrence of inflammation about the beginning of the urethra, ſo as to occaſion the urine to be diffuſed in the cellular ſubſtance on the outſide of the bladder, and thereby producing ſinuſes difficult to cure; the extreme difficulty of healing the wound, eſpecially in bad conſtitutions: and laſtly, the ſmall number of patients, after the age of thirty, who have been found to recover from this operation.

Lateral operation.] Frère Jacques, a French prieſt, was the inventor of the lateral operation. He firſt appeared at Paris in 1697, and afterwards operated in a great number of caſes.

He introduced a ſound through the urethra into the bladder with a ſtraight biſtoury, cut upon the ſtaff, and carried his inciſion along the ſtaff into the bladder. He then introduced the fore-finger of the left hand into the bladder, ſearched for the ſtone, which, having withdrawn the ſound, he extracted by means of forceps. The patient was now carried to bed, and the after-treatment left to the attendants.

Profeſſor Rau, of Holland, improved upon this method, by making a groove in the ſtaff, which enabled him, with greater certainty, to continue his inciſion into the bladder; but inſtead of dividing the urethra and proſtate gland, the latter of which he was afraid of wounding, he diſſected by the ſide of the gland, till the convex part of the ſtaff was felt in the bladder, where he made his inciſion, and extracted the ſtone; but this method was too difficult to perform, and attended with too many inconveniences and dangers ever to be generally received. It ſuggeſted, however, to the celebrated Cheſelden the lateral method of cutting, as it is now with a few alterations very generally practiſed. We ſhall attempt to deſcribe the different ſteps of this operation in its preſent improved ſtate.

Preparatory treatment.] The manner of preparing the patient depends upon a variety of circumſtances. If he be plethoric, a few ounces of blood ſhould be taken away, and at proper intervals the bowels ought to be emptied by any gentle laxative which will not gripe. The diet ſhould conſiſt of light food for ſome time previous to the operation. If the pain be violent, opium is neceſſary. Sometimes it is relieved by keeping the patient in bed with the pelvis raiſed ſo as to remove the ſtone from the neck of the bladder. He ought not to ſit up, or take any exerciſe, in the time of preparation. The warm bath ought to be uſed two or three times, and the patient ſhould remain in it half an hour at each time. A laxative ought to be given on the day preceding the operation, and an injection a few hours before it is performed. The patient ought to drink plentifully of ſome diluent liquor, and to retain the urine ſeveral hours previous to the operation. If this cannot be readily effected, a ſlight compreſſion, by means of a ligature, may be made upon the penis, ſo as to have the bladder ſufficiently diſtended, that there may be no danger of the poſterior ſurface being hurt by the end of the gorget. The perinæum and parts about the anus ſhould be well ſhaved.

Improved operation.] A table ſomewhat more than three feet in height, and of ſufficient ſtrength, is now to be firmly placed, and properly covered with blankets, pillows, &c. Upon this the patient is to be laid and properly ſecured; and for this purpoſe there ought to be two pieces of broad firm tape, each about five feet in length, which are to be doubled and a nooſe formed upon them. A nooſe is then to be put upon each wriſt, and the patient deſired to lay hold of the middle of his foot upon the outſide. One end of the ligature is to go round the hand and foot, and the other round the ankle and hand, and croſs again ſo as to repeat the turns in the reverſe way. A running knot is then to be tied, by which the hand and foot will be properly ſecured. The buttocks are then to be made to project an inch or two over the table, and to be raiſed conſiderably higher than the ſhoulders by a couple or more pillows, and one ought to be put under his head.

The operator is now to introduce a grooved ſtaff (fig. 66) of proportionable ſize, and open to the very end, through the urethra, into the bladder; and having again fully ſatisfied himſelf of the exiſtence of a ſtone, he inclines the ſtaff, if the ſurgeon be right-handed, obliquely over the right groin, ſo that the convex part of the ſtaff, may be felt in the perinæum on the left ſide of the raphe. He then fixes it, and delivers it to his aſſiſtant, who is to hold it with his right hand, deſiring him to preſs it gently, in order to make the ſulcus of the ſtaff project in the direction in which he received it. With his left hand the ſame aſſiſtant is to raiſe and ſupport the ſcrotum.

The thighs of the patient being ſufficiently ſeparated by the aſſiſtants, and the ſurgeon being ſeated upon a chair of a proper height, and in a convenient light, he makes an inciſion with a common convex-edged ſcalpel through the ſkin and cellular ſubſtance, immediately below the ſymphiſis of the oſſa pubis, which is a little below the ſcrotum, and where the crus penis and bulb of the urethra meet, and on the left ſide of the raphe, and continues it in a ſlanting direction downwards and outwards to the ſpace between the anus and tuberoſity of the iſchium, ending ſomewhat lower than the baſis of that proceſs, by which a cut will be made of three or four inches in length. This inciſion ought not to be ſhorter than is here directed, otherwiſe there will not be room for the reſt of the operation. As ſoon as the integuments are thus divided, he ought to introduce two of the fingers of the left hand. With one he keeps back the lip of the wound next the raphe, and with the other he preſſes down the rectum. He ought likewiſe particularly to guard againſt cutting the crura of the penis, which he can readily feel, and ſeparate at their under part with one of the fingers. He next makes a ſecond inciſion almoſt in the ſame direction with the firſt, but rather nearer to the raphe and anus, by which he preſerves the trunk of the arteria pudica. By this inciſion he divides the tranſverſalis penis, and as much of the levator ani and cellular ſubſtance within theſe as will make the proſtate gland perceptible to the finger. If any conſiderable veſſel be cut, it is immediately to be ſecured, though this is ſeldom neceſſary. After this he will have a view of the membranous part of the urethra, which is diſtinguiſhed from that covered by the bulb by being very thin. He is now to ſearch for the groove of the ſtaff with the fore-finger of his left hand, the point of which he preſſes along from the bulb of the urethra to the proſtate gland, which ſurrounds the neck of the bladder. He keeps it there; and turning the edge of the knife upwards, he cuts upon the groove of the ſtaff, and freely divides the membranous part of the urethra, from the proſtate gland to the bulb of the urethra, till the ſtaff can be felt perfectly bare, and that there is room to admit the point of the finger; and as the finger aſſiſts in keeping the parts ſtretched, and effectually prevents the rectum from being hurt, the inciſion into the urethra may be made with perfect eaſe and ſafety.

The next part of the operation, viz. dividing the proſtate gland and neck of the bladder, might, by a dexterous operator, be ſafely performed with a common ſcalpel, with the edge turned the oppoſite way. But to guard againſt accidents, a more convenient inſtrument, called the *cutting gorget* (fig. 67), is now in general uſe. It was originally invented by Mr. Hawkins of London, and ſince his time has undergone various alterations. Fig. 68 is a double gorget invented by Dr. Monro. The inner plate, which is blunt, is made to ſlip forwards to protect the back part of the bladder. The membranous part of the urethra being now divided, and the fore-finger ſtill retained in its place, the point of the gorget, previouſly fitted to the groove, is to be directed along the nail of the finger, which will ſerve to conduct it into the groove of the ſtaff; and as this is one of the niceſt parts of the operation, the moſt particular attention is here required that the point of the gorget be diſtinctly heard to rub in the bare groove, and that nothing is interpoſed.

In the introduction of the gorget into the bladder, if the aſſiſtant could be depended upon, the ſtaff might be allowed to remain in his hand: the operator, however, generally chooſes to manage it himſelf. He now riſes from his ſeat, takes the ſtaff from the aſſiſtant, raiſes it to near a right angle, and preſſes the concave part againſt the ſymphyſis of the oſſa pubes; ſatisfies himſelf again that the point or beak is in the groove, and then puſhes on the gorget, following the direction of the groove till the beak ſlip from the point of the ſtaff into the bladder. The gorget is not to be puſhed further than this, otherwiſe it may wound the oppoſite ſide of the bladder, &c.

The gorget having now entered the bladder, which is readily known by the diſcharge of urine from the wound, the ſtaff is to be withdrawn, and the finger introduced along the gorget to ſearch for the ſtone, which, when felt, will point out the direction to be given to the forceps; at any rate the introduction of the finger ſerves to dilate the wound in the bladder; and this being done, a pair of forceps (fig. 69) of a proper ſize, and with their blades as nearly together as their form will allow, are to be introduced, and the gorget withdrawn ſlowly, and in the ſame direction in which it entered, ſo as to prevent it from injuring the parts in its return. After the forceps are introduced, and paſſed till they meet with a gentle reſiſtance, but no further, the handles ought to be depreſſed till they are ſomewhat in an horizontal direction, as this will moſt correſpond with the fundus of the bladder. One blade of the forceps is to be turned towards the ſymphyſis of the pubes to defend the ſoft parts there, the other of conſequence guards the return. After they have diſtinctly touched the ſtone, by moving them a little in various directions, they are then to be opened, and the ſtone laid hold of, which may generally be done with conſiderable eaſe. It frequently happens, however, that when the ſtone is ſmall, it is not readily felt with the forceps; and inſtances may happen where the under and back part of the bladder may be ſo depreſſed as to conceal the ſtone. In ſuch a ſituation, nothing will more readily bring it in the way of the forceps than to introduce the finger into the rectum, and elevate this part of the bladder. Straight forceps are generally uſed; crooked ones, in ſome very rare caſes, however, may be neceſſary, and therefore the ſurgeon ought to be provided with them.

After the forceps has laid hold of the ſtone, if it be ſmall and properly placed, it may readily be extracted; but if, on the contrary, the handles of the forceps are now obſerved to be greatly expanded, it is certain the ſtone is improperly fixed, or that it is remarkably large: in either caſe it ſhould not be held faſt, but allowed to move into the moſt favourable ſituation; or the finger is then to be introduced ſo as to place it properly for extraction. If this cannot be done with the finger, it ought to be allowed to ſlip out of the forceps, in order to get it more properly fixed; and as the moſt common form of the ſtone is flat and oval, or ſomewhat like a flattened egg, the forceps ſhould have hold of the ſmalleſt diameter, while an end preſents to the neck of the inſtrument. The ſtone ſhould be graſped with no greater firmneſs than
ient to bring it fairly out. It ſhould be extracted
adual manner.

ne is broken in the bladder, all the larger pieces are
l by the forceps, which are to be introduced by means
ving as a director. The ſmaller parts are to be re-
of a ſcoop (fig. 70), or probably the finger may

be more convenient; and as the leaſt particle allowed to remain, or which is not waſhed off by the urine, may ſerve as the nucleus of another ſtone, a large quantity of water, properly warmed, is to be injected by a bag and pipe, or by a ſyringe, and for this purpoſe the body of the patient ſhould approach at leaſt to an upright poſture; and to give the particles of ſtone an opportunity of collecting near the inciſion of the bladder, the wound may be ſtopped for a while after the injection is thrown in.

When a ſtone is extracted of a regular, firm, and rough ſurface, it ſeldom happens that any others remain in the bladder. On the contrary, when it is of an irregular ſhape, and ſmooth and poliſhed, particularly in certain places, with impreſſions formed upon it, there is the greateſt probability of others remaining. There are exceptions, however, to theſe rules; and therefore the operator, inſtead of truſting to them, ſhould introduce his finger, which will anſwer the purpoſe without any other ſearcher.

Subſequent treatment.] If, after the operation, any conſiderable artery bleeds much, it is to be taken up with a ligature; but if this be impracticable, the hemorrhagy ought to be ſtopped by means of preſſure, and for this purpoſe a firm roller introduced at the wound anſwers ſufficiently: and to prevent any ſtoppage to the diſcharge of urine, a ſilver canula, covered with caddice, and duſted over with ſtyptic powder, may be introduced into the wound with advantage.

Sometimes it happens that a conſiderable quantity of blood, inſtead of paſſing off by the wound, is collected in the cavity of the bladder, and may produce very dangerous ſymptoms. To prevent this as much as poſſible, immediately upon the operation being finiſhed; the patient's pelvis ſhould be placed conſiderably lower than the reſt of his body; by which means the wound will be kept in a depending poſture, and the blood will eſcape more readily by the wound. But if it be found that blood is ſtill lodged in the cavity of the bladder, it muſt be immediately extracted.

As ſoon as the bleeding is ſtopped, the patient is to be untied, a piece of dry ſoft charpie put upon the lips of the wound, and often renewed, and the thighs brought together. He is then to be laid in a bed, in ſuch a way that the pelvis may be conſiderable lower than the reſt of the body, to give a favourable direction to any blood which may afterwards flow from the wound. A conſiderable doſe of laudanum is now to be given. From thirty to fifty drops for an adult will commonly be neceſſary. From this period, unleſs the ſtone has been large and difficult to extract, the patient commonly falls aſleep, or at leaſt lies quiet for a few hours; but afterwards generally begins to complain of pain in the under part of the abdomen. Anodynes are now to be given both by the mouth and anus, and warm fomentations, by means of flannels, or bladders filled with warm water, are to be applied to the region of the bladder, as the affection ſeems to be of the ſpaſmodic kind.

If by a continuance of theſe remedies the pain abates, no anxiety need be entertained concerning it; but if it increaſe, and eſpecially if the abdomen become hard and ſwelled, and the pulſe full and quick, and theſe ſymptoms become gradually worſe, great danger is to be apprehended, as they moſt commonly take place in conſequence of inflammation. In this ſituation, as much blood ought to be taken as the patient can bear. A large injection of warm water and oil, or linſeed tea, ſhould be given every ſix or ſeven hours, and the fomentations continued at the abdomen. If the ſymptoms continue to grow worſe, the patient ſhould be immediately put into the ſemicupium or warm bath.

By a proper continuance of theſe means, with a low diet and plenty of diluent drink, the above ſymptoms may frequently be removed. The reverſe, however, is ſometimes the caſe. The wound becomes ſloughy and ill-conditioned; all the ſymptoms, in ſpite of every effort, continue to increaſe, and ſoon terminate in death.

But where matters end favourably, the wound by degrees puts on a better appearance; the urine paſſes almoſt from the beginning by the urethra (moſt frequently, however, it is diſcharged by the wound for the firſt two or three weeks); the pain in the abdomen gradually abates, the feveriſh ſymptoms are ſoon removed, a complete cicatrix is formed, and the wound is ſometimes cured in a month; though upon other occaſions three will be neceſſary. But it muſt depend greatly on the nature of the conſtitution.

Excoriation of the buttocks may be prevented by placing a ſheet under them ſeveral times doubled, the breadth to be eighteen or twenty inches, and to be all rolled up, except the part which is to be laid under the patient, the reſt of the roll to be by his ſide, which is to be unrolled as the nurſe draws the wet part from under him. If, after the uſe of this, excoriations ſhould ſtill happen, the part may be waſhed with cold water; or the parts round the wound, after being well dried, may be rubbed with any ſimple ointment.

In patients of a debilitated conſtitution, incontinence of urine frequently occurs after this operation. In general, this is removed as the patient acquires ſtrength. Nouriſhing diet, cold bath, the bark, and other tonics, are of much ſervice here; but where theſe are afterwards found ineffectual, inſtruments for compreſſing the penis, or others for receiving the urine, have been found uſeful, and are now made in ſuch a convenient way as to allow them to be conſtantly uſed ſo long as they may be found neceſſary.

Lithotomy in females.] An operation for ſtone in the bladder is much ſeldomer required in women than in men, on account of the ſhortneſs of the urethra in the former allowing a readier paſſage for the ſmall calculi which get into it, or are formed in the bladder. It is likewiſe in women more ſimple, and of courſe more readily performed. It might be done in the ſame manner as in the male, but there would be the greateſt probability of wounding the vagina. In a few caſes the operation has been performed from the vagina itſelf; but it is by no means adviſable, as ſtones would not only be extracted with greater difficulty, but, on account of the thinneſs of the parts, the urine would moſt probably form a fiſtulous opening, and a communication be maintained between the bladder and vagina; or cicatrices here might be attended with great inconvenience in child-birth.

In the method commonly practiſed, the patient being placed and ſecured in the ſame manner as in the operation upon the male, the operator introduces a ſhort grooved ſtaff, ſlightly curved (fig. 71) into the bladder; then by means of the common gorget already mentioned, with its point paſſed along the groove of the ſtaff, he lays open the whole of the urethra and the neck of the bladder. The ſtaff is now to be removed, the finger introduced upon the gorget to feel for the ſtone, which is to be removed as already directed for the operation on the male ſubject. Where incontinence of urine occurs after the wound is healed, a peſſary is to be uſed within the vagina, or a ſponge applied, or a tin machine to receive the urine.

SECT. III. *Of* STONES *in the* KIDNEYS.

The ſymptoms of ſtone in the kidneys are, pain in the region of the kidneys, ſickneſs, and vomiting, the urine ſometimes mixed with blood, at other times with mucus, or even purulent matter; but the ſame ſymptoms are often induced by other cauſes, eſpecially from inflammation and ſuppuration of the kidney. Nephritic complaints have frequently ſubſiſted for a long time, where ſtones have been blamed as being the cauſe of them; and yet upon diſſection purulent matter alone has been detected. From this circumſtance, as well as from the great depth of the parts, and the large ſize of the blood-veſſels of the kidneys, the operation of nephrotomy could not be performed, but with the greateſt uncertainty and moſt imminent danger, and is therefore never attempted. A few caſes indeed have appeared, where inflammation, induced by a ſtone in the kidney, terminated in abſceſs, and the ſtones were taken out; but it was not till they had worked their way out of the kidneys into the cellular ſubſtance, ſo that it only remained to open the abſceſs and extract them; but otherwiſe the operation is never to be thought of.

SECT. IV. *Of* STONES *in the* URETHRA.

Thoſe who are troubled with calculous complaints frequently paſs ſmall ſtones along with their urine: and when theſe are angular or of conſiderable ſize, they ſometimes ſtick, and give much uneaſineſs. The ſymptoms are at firſt pain, then inflammation and ſwelling, attended with a partial, or a total ſuppreſſion of urine, which, if long neglected, is apt to terminate in a rupture of the urethra, when the urine will be diſcharged into the neighbouring parts. The greateſt attention is therefore neceſſary to get the ſtone extracted as ſoon as poſſible.

When a ſtone is in the urethra, unleſs it be of a large ſize, or has been long impacted, and the inflammation great, attempts ought to be made with the fingers to puſh it out; but previous to this, the penis ſhould be relaxed as much as poſſible, ſo as to remove a certain degree of ſpaſm which the preſence of ſtone here probably creates. Blood ought to be drawn by general or local means, according as the patient may be of a plethoric or emaciated habit. He ſhould be immerſed in a warm bath, and get a full doſe of laudanum, and warm oil ought alſo to be thrown into the urethra. After theſe remedies have relaxed the parts as much as may be, the extraction is to be attempted.

For this purpoſe certain inſtruments have been contrived, particularly a tube containing a pair of elaſtic forceps (fig. 72), to be introduced into the urethra ſo as to lay hold of the ſtone. In ſome caſes they certainly might anſwer the purpoſe, but they have not been found very uſeful; and as they may increaſe the irritation already preſent in the urethra, they are ſeldom, if ever, employed. Inſtead of them, the ſurgeon uſes gentle preſſure on the penis to puſh the ſtone outwards; and as calculi larger than a field bean have ſometimes been paſſed by the urethra, an operation ought not to be performed till gentle means have been perſiſted in for ſome time. When theſe means have failed, an inciſion ought to be made immediately upon the ſtone, which is then to be removed by a probe, or with a pair of ſmall forceps. When a ſtone is lodged near the neck of the bladder, after the patient has been placed and ſecured in the ſame manner as for the lateral operation, while an aſſiſtant ſupports the ſcrotum and penis, the operator introduces a finger, oiled, into the anus, to ſupport the ſtone in its place, and prevent it from ſlipping into the bladder. An inciſion is then to be made, and the ſtone turned out. The after-treatment will be nearly the ſame as that after the operation of lithotomy.

When, again, a ſtone has advanced further in the urethra, the beſt method is to draw the ſkin ſtrongly forwards or backwards, and then to cut upon it and turn it out, when the ſkin will ſlide back ſo as to cover the wound, and prevent the urine from paſſing through it; and by this means it will generally heal by the firſt intention. If part of the urine paſs through the wound, and inſinuate into the cellular ſubſtance, an attempt is to be made with the hand to preſs it back. If that prove inſufficient, a cut is to be made through the ſkin oppoſite to the inciſion of the urethra; but this will ſeldom be found neceſſary. If a ſtone is fixed near the point of the urethra, it may be removed with a pair of forceps; for if this fail, the urethra is to be dilated with a ſcalpel; and if this alſo be inſufficient, an inciſion is to be made as above directed. When h e cure is nearly completed, a tube formed of ſilver or elaſtic gum, or a hollow bougie, may be uſed to keep the urethra of a proper ſize.

The worſt part of the urethra for a ſtone to ſtick in, is that immediately behind the ſcrotum; for then the urine is apt to paſs by the inciſion into the cellular ſubſtance of the ſcrotum, ſo as to occaſion large ſwellings there. To prevent this, a ſtone ſo ſituated ought, if poſſible, to be puſhed forwards with the fingers; or if this be impracticable, it ſhould be puſhed back into the perinæum by means of a ſtaff. If both methods fail, a cut is to be made at the under part of the ſcrotum, which is to be well ſupported, and at one ſide of the ſeptum, and continued upwards till the ſtone is felt, when an inciſion is to be made into the urethra, and the ſtone extracted as before directed.

Chap. XXVIII. Of INCONTINENCE and SUPPRESSION of URINE.

Incontinence of urine may ariſe from various cauſes, as from a loſs of power in the ſphincter of the bladder, while the natural tone of that organ remains unimpaired; or from irritation about the neck of the bladder, produced by the friction of ſtones contained in it; or from a laceration of parts by the operation of lithotomy; or from the preſſure of the uterus in a ſtate of pregnancy.

When the diſeaſe is owing to a want of tone in the ſphincter, the cure is very difficult, becauſe the conſtitution in general is frequently affected. The moſt uſeful remedies are tonics, eſpecially Peruvian bark, chalybeate waters, and the cold bath, both generally and locally applied. Cold ſubſtances applied to the perinæum are perhaps of greater ſervice than any thing elſe, as cloths wet with vinegar and cold water, or with a ſtrong ſolution of muriated ammonia in vinegar; but the beſt method of applying cold is to daſh water immediately from the fountain upon the anus and perinæum. When it ariſes from the irritation of ſtones in the bladder, opiates and mucilaginous liquors plentifully uſed frequently give great relief. When incontinence of urine is owing to a laceration of parts in performing the operation of lithotomy, the diſeaſe is nearly of the ſame nature as that from the cauſe firſt mentioned, and therefore the ſame remedies are of ſervice. When theſe remedies fail in either of the caſes, compreſſion of the urethra prevents any inconvenience ariſing from the conſtant dripping of the urine; and for this purpoſe an inſtrument termed *jugum penis* (plate III. fig. 73) is applied to the penis; or, to preſs againſt the urethra of the female, peſſaries (fig. 74) are contrived, which are made in ſuch a way as to be introduced into the vagina, and there to preſs upon the urethra. They are ſometimes made of ſponge, but thoſe of cork or box-wood well poliſhed are more generally preferred. For a male a ring of elaſtic gum, or, for a female, a ſmall bottle made of the ſame, and open at both ends for the paſſage of the menſtrual diſcharge, anſwer the purpoſe ſtill better. Certain caſes however occur where preſſure upon the urethra is improper, eſpecially where there is a conſtant deſire to paſs water; and here much relief is obtained from the uſe of receivers, or *urinals*, which are now ſuited to both ſexes.

We ſhall here treat only of that ſpecies of ſuppreſſion of urine where the urine is collected in the bladder, but from ſome obſtructing cauſe is prevented from being diſcharged. It ariſes from a variety of cauſes.

1. When it ariſes from a *want of tone* in the body of the bladder, it is often connected with palſy of the lower extremities: it is frequently owing alſo to retaining urine too long. The catheter, in this caſe, is commonly an effectual remedy, and ought to be employed as ſoon as the ſuppreſſion is evidently formed, and repeated from time to time, till the tone of the ſyſtem is recovered by the uſe of proper remedies. The method of introducing the catheter is the ſame with that already directed for ſounding for the ſtone. Fig. 75 is a catheter for the male, fig. 76 one for the female.

2. When the affection ariſes *from ſpaſm* about the neck of the bladder, opiates, warm water thrown into the rectum, and afterwards the warm bath, are the beſt means of producing relief. When it proceeds from the ſcirrhus of the proſtate gland, or from other tumors, or from obſtructions of the urethra in conſequence of gonorrhœa, the treatment to be afterwards deſcribed will be found beſt ſuited for ſuch complaints. When the ſuppreſſion ariſes from the preſſure of the uterus in the latter months of pregnancy, change of poſture is ſometimes found to have ſome effect; but if this fail, immediate relief can commonly be given by the introduction of the catheter, which in women is for the moſt part readily done.

3. Suppreſſion of urine *from inflammation affecting the neck of the bladder* is one of the moſt alarming varieties of the diſeaſe, as it produces pain, and ſuch a degree of ſwelling in the parts as to render the introduction of the catheter impracticable. It may ariſe from the matter in gonorrhœa paſſing backwards along the courſe of the urethra. An improper uſe of injections has likewiſe frequently produced this ſpecies of the diſeaſe. The treatment is nearly the ſame as for inflammatory complaints in other parts of the body. Blood-letting ſhould be employed, and particularly leeches ſhould be applied to the perinæum. Opiates ought to be given in large doſes, Injections of warm water ſhould be frequently thrown up the rectum, and the whole body ſhould be im-

merſed in the warm bath. If theſe means be properly uſed, they will very ſeldom fail of ſucceſs; but when they do not prove effectual, when the bladder becomes painfully diſtended, and when every attempt to introduce the catheter has failed, nothing is to be depended upon but a puncture made into the body of the bladder, in order to diſcharge the water contained in it.

Various methods have been propoſed for effecting this operation. *Puncturing the bladder* above the pubes has been recommended by many reſpectable authors. Mr. Home, in an excellent paper on this ſubject, publiſhed in 1799, deſcribes three ſituations, in which this operation is performed; viz. in the perinæum, above the pubis, and through the rectum. "There are," ſays he, "caſes publiſhed, giving an account of the event of each of theſe different modes; but in an operation of ſuch rare occurrence, no author that I have met with has given, from his own obſervation, ſucceſsful caſes of the different operations, explaining the ſymptoms, ſo as to allow of their being compared together, and the advantages and diſadvantages of each fairly appreciated."

In the year 1788, Mr. Home aſſiſted the late Mr. Hunter in performing this operation above the pubis, in a caſe which terminated favourably, and himſelf, in 1799, performed it in two inſtances through the rectum with equal ſucceſs. He therefore ſtates the particulars of theſe caſes in the following way:

Case I. "A gentleman, thirty years of age, had laboured under ſymptoms of ſtricture in the urethra for nine years, and had been occaſionally attacked with fits of ſtrangury; theſe attacks were relieved by introducing a bougie, which inſtrument was uſed only on ſuch occaſions.

"In January, 1788, one of theſe fits of ſtrangury came on; during the firſt two or three days his urine paſſed only by drops, but at laſt there was a total ſtoppage of it. This alarmed the attending ſurgeon, and after the ſuppreſſion had continued for twenty-four hours, Mr. Hunter was ſent for at twelve o'clock at night to perform ſome operation to empty the bladder. The ſtate of the patient having been mentioned along with the meſſage, Mr. Hunter deſired me to accompany him, and to carry different inſtruments, that he might be enabled to act according to the circumſtances of the caſe.

"When we were introduced to the patient," ſays Mr. Home, "he had ſickneſs, with retching, and a ſlight hiccup; no inſtrument could be paſſed by any effort into the bladder, although repeated attempts were made for that purpoſe; it therefore appeared to Mr. Hunter, that no time was to be loſt in relieving the bladder. On examining the belly, the tumor extended as high as the navel, and the parts were ſore to the touch: by introducing a finger into the rectum, the bladder was felt to preſs backward into the hollow of the ſacrum.

"In conſidering the beſt ſituation for puncturing the bladder, Mr. Hunter would have preferred the perinæum, and would have performed the operation in the manner recommended in his Treatiſe on the Venereal Diſeaſe, that he might have emptied the bladder and removed the ſtricture at the ſame time; but in the night he thought the circumſtances unfavourable for ſo delicate an operation; he was unwilling to make the puncture through the rectum, from an idea that the orifice could not be continued open till the ſtricture was removed; he therefore determined to make the puncture above the pubis.

"In performing the operation, he felt for the os pubis as a guide, chooſing to be as near it as poſſible, that he might avoid entering the cavity of the peritonæum; but the parts were ſo diſtended, that he could not feel the bone, and was therefore obliged to gueſs at its ſituation.

"He firſt made an opening through the ſkin with a lancet, and then paſſed the trochar perpendicularly down into the bladder. Upon withdrawing the trochar, the urine ruſhed out with violence through the canula; a flexible gum catheter was then introduced, and the canula of the trochar withdrawn over it; the catheter was retained in its place by tying it to a bandage paſſed round the body directly above the opening.

"In conſequence of the diſtenſion of the bladder, and the opening into it, there was a good deal of pain in the abdomen, ſoreneſs when the external parts were preſſed, heat on the ſkin, and frequency of the pulſe, which led to a ſuſpicion of there being an inflammation of the peritonæum. Leeches were twice applied to the abdomen, fomentations were uſed, and an application of ſpirits kept almoſt conſtantly upon the belly; ſaline draughts, gently opening medicines, and anodyne clyſters, were occaſionally had recourſe to. Theſe ſymptoms ſubſided, and the urine came principally and freely by the ſide of the inſtrument.

"The next object was to *dilate the ſtricture*; this was attempted by the bougie; bougies of a ſmall ſize ſometimes ſeemed to paſs, but there was no proof of their having really done ſo.

"About a fortnight after the operation, the cellular membrane appeared at the orifice of the wound, like wet lint; a ſwelling was perceived on each ſide, extending to the ſpine of the os ilium, in which there was an evident fluctuation; this aroſe from the formation of matter in conſequence of the urine having inſinuated itſelf into the cellular membrane.

"After perſevering with the bougie for three weeks without making any progreſs, the cauſtic was uſed; when it had been applied twice, a ſmall ſilver ſound was paſſed, which found its way into the bladder. This was kept in the urethra for ſix days, and when it was withdrawn, one of a larger ſize was paſſed, and retained there for five days. Some of the water now paſſed by the urethra at the ſide of the ſound, but with great pain. In five weeks from the time of the operation, the patient was evidently beginning to ſink, had a wild deſponding ſtare, and all the common ſymptoms of hectic fever; it therefore appeared abſolutely neceſſary to remove the catheter from the artificial opening in the bladder as ſoon as it could be done with ſafety. The ſilver ſound was taken out of the urethra, and an attempt was made to paſs a flexible gum catheter, which fortunately found its way into the bladder.

"The moment this was accompliſhed, the catheter, which had remained in the bladder forty days, was withdrawn from the opening above the pubis, and it brought along with it a quantity of cellular membrane in the ſtate of ſlough; this was followed by near a pint of matter.

"From this time the patient began to mend in his health; in a few days the orifice of the wound was almoſt cloſed, little of the urine coming that way, as the greater part was regularly drawn off by the catheter in the urethra. In ſix days the catheter was taken out; upon withdrawing it, the ſurface was found incruſted with calculous matter, ſo as to hurt the parts as it paſſed along the canal, and another was immediately introduced.

"About this time the wound above the pubis healed up, but very ſoon broke out again, and diſcharged a quantity of matter without urine, which led to the belief that the orifice in the bladder was healed. He was now allowed to ſit upon a couch, and eat whatever agreed with him.

"After the ſecond catheter had remained in the urethra ſix days it was withdrawn, and was found incruſted as much as the former; another was immediately introduced. The wound above the pubis healed a ſecond time: at the end of four days the third catheter was withdrawn, and the parts left to themſelves; in four hours after the catheter had been taken out, the patient had an inclination to make water, which he did with great freedom; this was at the end of the eighth week, and he continued to do ſo for ſeveral days, when the wound above the pubis broke out again and diſcharged matter, and afterwards urine. In three days the orifice of the wound began again to contract, the urine paſſed more freely by the urethra, and the wound once more healed. Matter collected again on each ſide of the abdomen, and there was diſcharged externally a quantity of fœtid matter. After ſome days a freſh opening took place on the right ſide, giving a free vent to the matter lodged there; the original wound now healed entirely, but another abſceſs formed near the groin; this broke and diſcharged freely; both theſe openings healed in a ſhort time, and in thirteen weeks from the time of the operation, the parts were all conſolidated."

The patient continued well, and made water freely when this account was drawn up, eleven years after the operation.

Mr. Home next relates ſome caſes of ſuppreſſion of urine in which the bladder was punctured through the rectum.

Case II. "A gentleman, forty-ſix years of age, twenty-five years ago, had a gonorrhœa; the inflammatory ſymptoms of which were removed in ſix weeks, but the diſcharge continued above a year. This led him to conſult different practitioners, who employed a variety of injections to get rid of it; after the uſe of theſe, there was a greater frequency in making water than he had before experienced, and an uneaſy feel along the urethra, particularly near the bladder. Theſe ſymptoms continued, and rather increaſed for ſix years, when a new ſymptom came on, which was an occaſional want of power to make water, laſting a few ſeconds and then going off.

"Theſe ſtranguries increaſed gradually in frequency and duration, and in eighteen years they had rendered the bladder ſo irritable, that it never retained more than three ounces of water at a time, and very often not half that quantity. The patient's mind was kept in a conſtant ſtate of apprehenſion of a complete ſtoppage; his general health was much impaired, and the ſlighteſt expoſure to cold affected his bladder ſo as to give him inceſſant calls to make water.

"Under theſe circumſtances," ſays Mr. Home, "I was conſulted; it was found upon examination, that ſtrictures in the urethra had brought on the preſent ſymptoms. For the removal of theſe he put himſelf under my care, and that he might have every neceſſary aſſiſtance, took lodgings near me.

"The firſt ſtricture met with was four inches and a half from the external orifice. On the 25th of June, I applied a bougie, armed with the argentum nitratum, to this ſtricture, which gave him conſiderable local pain, but the application relieved the irritation in the bladder, and he made water more freely than before; the ſame treatment was uſed every other day, and three applications were found ſufficient to open this part of the canal.

"There was a ſecond ſtricture at ſix inches from the external orifice; to this the armed bougie was applied on the firſt of July, and in a few hours one of his uſual attacks of irritation came on, with ineffectual ſtraining to make water; this was relieved by paſsing a ſmall bougie into the badder, which however could not be done till after ſeveral ineffectual trials.

"July 2d, in the evening, the irritation returned with greater violence, and was very ſevere; no bougie could be paſſed, and a ſtarch clyſter, with thirty drops of tincture of opium, was thrown up; this was not retained, and the irritation increaſed. Upon a ſecond trial, at eleven o'clock, a ſmall bougie paſſed, and he diſcharged about two ounces of urine in a ſmall ſtream, which relieved him. In an hour the irritation returned, attended with a ſlight degree of delirium, great thirſt, reſtleſſneſs, and anxiety. At one o'clock in the morning no water had paſſed, and a bougie could not be introduced; an opiate clyſter was thrown up, containing forty drops of tincture of opium; in half an hour another was adminiſtered with ſixty drops, but the general irritation and painful ſenſations increaſed, and thirty drops of tincture of opium were given by the mouth. In this ſtate the patient, in a fit of deſpair, got a bottle of tincture of opium, and while the nurſe went into the next room, took, at two different times, 180 drops; ſo that in the ſpace of an hour and a half he had taken 210, beſides what was contained in the clyſters.

"This increaſed his delirium; at ten o'clock in the forenoon he was put into the warm bath, and after coming out, a ſmall catgut bougie paſſed into the bladder, and brought off about two ounces of water; this relieved him very much. He paſſed no water during the reſt of the day, and the warm bath was repeated in the evening; in the courſe of the night he paſſed nearly a pint of water, about two ounces at a time.

"July 4th, he took an opening draught, which procured him two or three motions. In the courſe of the day he voided a good deal of urine in ſmall quantities, with ſtraining and much pain. Theſe ſymptoms were aggravated by the piles, to which he had been accuſtomed, and which were now forced out, and were very large; they were punctured, and bled freely, which diminiſhed their ſize, but did not leſſen the pain.

"July 5th. Paſſed his urine with tolerable eaſe through the day in ſmall quantities, but a ſuppreſſion came on in the night, and at four in the morning he was in ſuch a ſtate of irritation as to give an alarm of his loſing his ſenſes. In this ſtate he expreſſed the moſt anxious deſire, that an opening might be made to empty the bladder; and his ſufferings for the laſt three days had been ſo great, that I thought myſelf juſtified in complying with his requeſt.

"The inſtrument I made uſe of was the long curved trocar, recommended by Pouteau, only made flat inſtead of being cylindrical, which rendered the point better adapted for wounding the bladder, and the flattened form was conſidered as better fitted for lying without inconvenience in the rectum.

"This inſtrument I have had by me for many years. I paſſed my finger up the rectum and felt the bladder, which was leſs prominent than it was reaſonable to expect; upon this finger I introduced the inſtrument with the point concealed in the canula, up to the part which I intended to puncture, then puſhed the inſtrument into the bladder. On withdrawing the piercer, the urine flowed freely through the canula; the quantity evacuated was only four ounces, but as the bladder for many years had not retained more than three ounces, this was a large quantity in the preſent irritated ſtate of that viſcus.

"The operation was performed on the 6th of July, at half paſt four in the morning; the wounding of the bladder gave him no ſenſible pain, and he felt very eaſy the moment the urine was evacuated. The canula was confined in the rectum by a bandage.

"As it was intended that the wound in the rectum ſhould be kept open till the ſtricture was removed, the canula was retained in the bladder till the edges of the wound ſhould be conſolidated by inflammation; after which, the urine paſſing through the fiſtula, would prevent its cloſing till that fluid was conducted by another channel.

"The urine was paſſed through it involuntarily, but did not flow conſtantly; and when it was forced out he felt a pain in the glans penis. He ſlept in the courſe of the forenoon more than he had done for two or three days, and was tranquil and comfortable; his mind was alſo at eaſe by having loſt the dread of a ſtoppage, which before affected him nearly as much as the reality.

"In the evening he took three ounces of miſtura camphorata, with thirty drops of tincture of opium. In the night, the ſame quantity of that mixture was given, with twenty drops of tincture of opium, in conſequence of the pain and irritation experienced when the urine was forced out by the action of the bladder.

"July 7th. The urine was paſſed at longer intervals, but the ſtraining at theſe times was great, and attended with pain; it felt to him that ſome drops lodged at the neck of the bladder, and he could not reſiſt the inclination of making an effort to diſcharge them. The ſame opiate draught was repeated at night, but did not prevent him from being very reſtleſs.

"8th. He took an opening draught, which operated and relieved him very much; there was no inconvenience from the inſtrument lying in the rectum. The intervals between the times of making water were longer than uſual; the opiate draught was repeated at night; he ſlept a good deal, and was much refreſhed.

"10th. The armed bougie was applied a ſecond time to the ſtricture, after which he had leſs irritation in the urethra at the time of the water paſſing through the rectum.

"11th. The irritation in the bladder was conſiderable, and the urine did not paſs readily through the canula, which induced me to remove it, as it had remained there five days. The ſides of the wound between the bladder and the rectum were conſidered to have had ſufficient time to be conſolidated by inflammation, to prevent the urine from inſinuating itſelf into the cellular membrane. Upon removing the canula the irritation ſubſided, and he ſlept well in the night with the uſual opiate.

"21th. The ſecond ſtricture was found to be removed, and the armed bougie was applied to a third ſtricture, about ſeven inches and a half from the external orifice. The urine was paſſed at regular intervals of half an hour through the wound without uneaſineſs. The uſual opiate was repeated at night; he ſlept well, and a few drops of water paſſed by the urethra.

"14th. Towards the afternoon he had a violent attack of irritation and conſtant inclination to make water, which came away with great uneaſineſs. He took thirty drops of tincture of opium, which made theſe ſymptoms ſubſide. After this three ounces of urine paſſed at one time, by the urethra, without pain, and the ſame quantity continued to paſs once an hour. He had a very comfortable night.

"15th. The armed bougie was applied a ſecond time to the third ſtricture; it gave a great deal of local pain, which laſted for an hour; his water paſſed eaſily through the day; the opiate draught was repeated, and he ſlept tolerably well.

"16th. The opening medicine was repeated, and he had no irritation in the bladder during the day; in the afternoon the greater part of the urine paſſed by the rectum, a ſmall proportion by the urethra; the opiate draught was repeated, and his night paſſed very quietly.

"17th. The armed bougie was applied a third time to the third ſtricture, and the water paſſed entirely by the urethra without much pain or ſtraining; the night draught was repeated, and he had a quiet night.

"18th. About two o'clock in the day he voided ſome blood through the penis, and alſo by the rectum, with a large piece of ſlough, and was very eaſy the reſt of the day; the opiate draught was repeated, and he had a good night.

"19th. The urine paſſed entirely through the rectum; he had a good night without the opiate draught.

"20th. The armed bougie was a fourth time applied to the third ſtricture; the local pain was very ſevere, and there was a ſmall diſcharge of blood; the pain laſted near two hours, but he had no inclination to make water for ſix hours; the water paſſed by the rectum without any ſtraining, and he did not again make any water for ſix hours.

"21ſt. About ſix o'clock in the morning, an irritation to make water came on, and returned at ſhort intervals; the urine paſſed through the urethra mixed with blood; this went off in the courſe of the day.

"23d. The unarmed bougie, which was uſed preparatory to introducing the armed one, paſſed into the bladder; the water came principally by the urethra, but with irritation and pain in the glans penis. He was reſtleſs in the fore part of the night, with irritation to make water, and took an opiate, which relieved him.

"27th. His urine paſſed by the rectum till the middle of the day, when a large ſlough came away by the penis, and immediately after it half a pint of urine in a full ſtream. This ſlough was probably that ſeparated from the wound in the bladder, which had fallen into the cavity. In four hours he made nearly the ſame quantity of water at one time.

" No water had paſſed by the rectum after the 27th, nor was it voided oftener than once in four or five hours; ſo that in three weeks from the time of the operation, the ſtrictures in the urethra were removed, and the orifice in the bladder no longer gave a paſſage to the urine.

" On the 31ſt he went out airing for the firſt time, his ſtrength and appetite being much improved.

" Auguſt 2d. The unarmed bougie was paſſed to aſcertain that the urethra continued free from ſtricture, and went more freely into the bladder than before.

" 12th. He was ſo well in every reſpect, that he went to the ſea to bathe for the benefit of his general health."

Mr. Home further obſerves, that the wound through the rectum continued open for three weeks, the time that was required to remove the obſtruction, but that it healed up as ſoon as there was a free paſſage for the urine through the natural canal.

Case III. " A gentleman, aged thirty-two, when fifteen years old, had a gonorrhœa, which, from great inattention in the patient, and from the uſe of irritating injections, did not ſubſide in the uſual time. The irritation extended itſelf along the urethra to the bladder, and brought on frequency of making water, attended with ſtraining and occaſional ſtrangury.

" Theſe ſymptoms never went entirely away; they were at times more ſevere, at others leſs ſo; and there were intervals of months in which he only made water once in four or five hours; theſe however were rare, and in general the bladder could not retain more than three or four ounces of water at any one time.

" There was this peculiarity in the caſe, that when the urine ſtopped, it produced a ſwelling behind the ſcrotum; when this was preſſed, ſome mucus came away, and was followed by urine; theſe occaſional ſtranguries ſometimes laſted ſeven or eight hours before they went off. He had recourſe to the common bougie, but none could be made to paſs into the bladder; afterwards the uſe of the cauſtic was attempted, but the ſurgeon had not confidence enough in that mode of treatment to induce him to perſevere in it, and after a few unſucceſsful trials he left it off.

" In Auguſt, 1799, his complaints became worſe than before; every morning there was a ſtoppage of urine that laſted ſeveral hours, which was with difficulty relieved by opium; under theſe circumſtances he came to London, and put himſelf under my care.

" As no bougie could be paſſed into the bladder, and there was reaſon to believe, from the account of the caſe, that a ſac or bag had formed in the peritonæum behind the ſtricture, the only chance of giving him relief appeared to be by applying the cauſtic; and ſhould the ſlough formed by the application at any time ſtop the ſmall orifice of the ſtricture, an opening muſt be made into the bladder to relieve the ſymptoms of ſuppreſſion, and admit of the proſecution of the cure.

" Under theſe circumſtances I entered upon the treatment of the caſe, and had the patient in lodgings near me, that every neceſſary attention might be given which the ſymptoms required.

" 24th. The armed bougie was applied to a ſtricture, three inches diſtant from the external orifice; the pain which this application produced was trifling, and it was not followed by any difficulty in the paſſing of his urine.

" 26th. The application was repeated to the ſame ſtricture.

" 28th. The firſt ſtricture was found to have been deſtroyed by the ſecond application, as the bougie now paſſed on ſix inches to a ſecond ſtricture, to which the armed bougie was applied.

" 30th. The application was repeated to this ſecond ſtricture, and in the evening the patient was unable to make water, although there had been neither pain nor irritation. An opiate injection, containing forty drops of tincture of opium, was thrown up in the evening; and a draught, containing twenty drops, was taken at twelve o'clock at night, and repeated at two in the morning.

" 31ſt. At ſeven o'clock in the morning the bladder was found to be much diſtended, as he had made no water for ſixteen hours; the irritation to make it was very great, and almoſt conſtant; and no inſtrument whatever could be made to paſs into the bladder. It was propoſed to puncture the bladder, without waiting till the parts were ſtill more irritated, and the patient's ſtrength and ſpirits more exhauſted. This was conſidered not only as a means of giving relief to the preſent ſymptoms, but of enabling us afterwards to proſecute the cure. Theſe reaſons induced the patient to give his conſent, and the operation was performed exactly in the ſame manner as in the former caſe. A pint and a half of urine were drawn off, and the inſtrument ſecured in the rectum.

" He felt immediate eaſe, in an hour fell aſleep, and paſſed the day perfectly tranquil. The urine did not conſtantly paſs out at the canula, although no plug was put into it; the firſt time of any coming away was at half paſt ten, three hours and a half after the operation; he made water again at four. His pulſe was not quicker than natural, and he had only ſlight irritation in the urethra.

" The reaſon why the urine does not conſtantly iſſue through the canula is, that its orifice is ſituated at ſome diſtance from that part of the bladder where the ureters open, and its end projects into the cavity like the waſte pipe in a ciſtern, which can have nothing paſs through it till the level of the water is raiſed above its orifice.

" September 1. He ſlept tolerably well during the night; paſſed his urine through the canula every four or five hours, in the quantity of nearly four ounces each time, and he had little or no uneaſineſs in the bladder or urethra.

" Towards the afternoon the canula was obſtructed by the mucus from the bladder, which was removed by paſſing a wire through it; the urine, however, did not flow readily till he got upon his knees, in which poſture half a pint came away, and a few drops by the urethra, with exquiſite pain.

" In the evening he had a paroxyſm of fever, or a fit of an ague, attended by head-ach. A pint of warm water was thrown up as a clyſter, which brought away a great deal of wind, and a copious ſtool. He was afterwards materially relieved. He took fifteen drops of tincture of opium, and had a quiet night.

" 2d. He was eaſy during the day, and had very little pain in the urethra. The urine did not paſs readily by the tube, which occaſioned his having a reſtleſs night.

" 3d. The armed bougie was applied to the ſtricture ſix inches diſtant from the external orifice, which gave leſs pain than the former applications. In the afternoon the canula was found to give more uneaſineſs from not allowing the urine to paſs; and as it had been in the bladder three days and a half, it was judged adviſable to remove it. This gave great relief, the urine, however, did not afterwards come through the wound, but by the urethra. He took fifteen drops of tincture of opium, and paſſed a reſtleſs night. He made water four times before morning by the urethra, nearly four ounces each time.

" 4th. At ſix in the morning he took an opening medicine, which operated in four hours, and relieved his uneaſineſs; he made water during the day every three or four hours, and paſſed a quiet night, ſleeping three hours at a time.

" 5th. The armed bougie was applied; he had no uneaſineſs during the day, and paſſed a quiet night.

" 7th. The ſtricture at ſix inches was found to be deſtroyed, and another was met with at ſeven inches, to which the armed bougie was applied. In the afternoon he made water in a better ſtream.

" 9th. The armed bougie was again applied to the ſtricture at ſeven inches; this brought on a ſwelling in the perinæum, which laſted ſeveral days, but did not impede the paſſing of the urine, nor did he afterwards experience any attack of ſtrangury, although the laſt ſtricture was not deſtroyed in three months; and the armed bougie was applied every ſecond or third day during the whole of that time.

" In this caſe the urine never came through the wound in the bladder after the canula was withdrawn, which is to be attributed to its finding a paſſage by the urethra, and the quantity the bladder held at any one time was inſufficient to diſtend that viſcus ſo much as to reach the wound in it made by the operation.

" In the former caſe the bladder was leſs diſtended, and therefore was wounded near the proſtate gland, which is probably the reaſon why the urine found a more ready paſſage through the canula; and when it did, why the bladder was more completely evacuated.

"From this circumſtance it would appear that there is an advantage in the puncture being made as near the neck of the bladder as it can be done with ſafety."

Mr. Home draws the following concluſions reſpecting the different modes of puncturing the bladder. He ſays,

"When the puncture is made above the pubis, the canula which incloſes the trocar is not to be removed, till the ſurrounding parts have been conſolidated by inflammation, ſo as to prevent the urine in its paſſage out from inſinuating itſelf into the neighbouring parts, for wherever the urine lodges, mortification takes place. Any advantage therefore, which may ariſe from a more flexible inſtrument remaining in the bladder, is more than counterbalanced by its not filling completely the aperture through the coats of the bladder, and allowing the urine to eſcape into the cellular membrane.

"When the coats of the bladder are inflamed and irritated to a very great degree, a wound in them is not neceſſarily productive of any bad conſequences; and when theſe ſymptoms are brought on by a retention of the urine, all that is requiſite for their removal is, not allowing any quantity of water to be accumulated in the bladder.

"When the puncture is made into the bladder through the rectum, it is not neceſſary to retain the canula in the orifice beyond the time in which inflammation conſolidates the ſides of the wound, as there is no danger of the aperture cloſing up, till there is another paſſage made for the urine.

"The wound in the rectum, whether it has a canula retained in it or not, does not allow the urine to eſcape, till a ſufficient quantity is collected to make the coats of the bladder act for its expulſion; and the quantity neceſſary for that purpoſe will vary according to the ſtate of the bladder at the time.

"The bladder, although contracted to a ſmall ſize by long-continued irritation, almoſt immediately on being relieved from that irritation, has a power of recovering itſelf, and allowing of a much greater degree of diſtenſion; otherwiſe the bladder in the ſecond of theſe caſes, which had not for many years retained more than three ounces of water at any one time, could not, in four days after the laſt ſtricture was deſtroyed, have retained half a pint."

The ingenious author throws ſtill further light upon this operation, in a ſhort account of the moſt material circumſtances attending a third caſe of puncture made in the bladder through the rectum.

Case IV. A gentleman, forty years of age, had a gonorrhœa in the year 1777, for the cure of which he uſed an injection; this irritated the urethra ſo much, as to bring on a ſuppreſſion of urine almoſt immediately after its application, which laſted three days, and then went off. He continued tolerably well till 1790, when the urethra had become ſo much contracted, as to make the paſſing his water a very tedious and difficult operation; and he believes, that his bladder was never entirely emptied. By the uſe of bougies the paſſage was dilated ſo as to allow of a tolerable ſtream of urine, but during their uſe he had ſeveral partial ſuppreſſions. In 1796 he was again obliged to return to the uſe of the bougie, but was unable to paſs one of the ſmalleſt ſize into the bladder; and from that time had ſuffered ſeverely from occaſional ſuppreſſions, great diſcharges of mucus, and a conſtant gleet. His urine, under the moſt favourable circumſtances, only paſſing in drops.

" In November, 1799," ſays Mr. Home, " he put himſelf under my care; the armed bougie was applied to a ſtricture five inches and a half from the external orifice; this application was repeated ſeven times, without any irritation being brought on, or an increaſed difficulty in voiding the urine. This ſtricture gave way, and the armed bougie was applied to a ſecond at ſeven inches: the firſt and ſecond applications to this ſtricture were attended with no particular ſymptoms; but after the third, which was on the 24th of November, a complete ſuppreſſion came on; this laſted eight hours, when, in conſequence of having taken fifty drops of tincture of opium by the mouth, and the ſame quantity in a ſtarch clyſter, he made an ounce and a half of water. In the courſe of the night the pain and uneaſineſs increaſed, and the fifty drops of tincture of opium were repeated.

" 25th. He made about two ounces of water; a clyſter of warm water was thrown up, which relieved his uneaſineſs, and he paſſed the night with tolerable eaſe, and made half a pint of water.

" 26th and 27th. He continued in a ſtate of great irritation, occaſionally paſſing ſmall quantities of water and mucus, but never enough at any one time to relieve the bladder.

" 28th. The bladder was very much diſtended, and diſtinctly felt above the pubis; its outline was even conſpicuous to the eye. In this ſtate I propoſed performing the operation of puncturing the bladder through the rectum, which was immediately aſſented to. For the reaſons already given, I uſed the trocar recommended by Pouteau, with a cylindrical canula. Sixteen ounces and a half of urine were diſcharged through the canula: the patient felt no pain in the operation any-where but in the glans penis, and that was only momentary; it however returned afterwards frequently in the ſame ſame part. The canula was left in, and he felt perfectly eaſy, all his diſtreſſes being removed. The urine paſſed away continually without any effort, or even the patient's knowledge. He had a tolerably quiet night, and ſlept the latter part of it.

" 29th. He complained of diſtenſion of the bowels from wind. In the afternoon the urine came away at intervals of half an hour; the verge of the fundament was excoriated by the urine paſſing through it. He had a very good night till one o'clock, when, attempting to expel ſome wind downwards, the canula was forced out of the bladder, which made him uneaſy and reſtleſs the remainder of the night.

"30th. At nine o'clock in the morning, the canula was withdrawn from the rectum; and in the courſe of the day the urine paſſed readily through the rectum.

"30th. The uſe of the cauſtic was reſumed, the water paſſing at intervals by the rectum, and a few drops by the urethra; there was an unuſual flatulence in the bowels, and great languor and debility.

"Theſe ſymptoms in a few days ſubſided.

"Dec. 5th. The urine continued to paſs freely through the orifice in the rectum.

"Jan. 6, 1800. Although the laſt ſtricture is not yet deſtroyed, all the diſtreſſing ſymptoms have ſubſided, and the patient is able to retain his water for ſix or eight hours at a time.

"When the urethra is perfectly quiet, the water now comes with tolerable freedom through that canal; and when it is diſturbed by the application of the armed bougie, the urine finds a paſſage by the orifice through the rectum, ſo that I am enabled to proſecute the cure; and judging, from the progreſs already made, there is no reaſon to doubt of its being ſoon completed.

"The cylindrical canula has an advantage in giving a more ready paſſage to the urine, and leaving an aperture in the bladder, by which it is afterwards more freely diſcharged; but its form, admitting of being embraced by the ſphincter muſcle, is unfavourable to the eſcape of wind, or the other contents of the bowels.

"In this caſe the air in the rectum having forced out the canula as ſoon as the inflammation upon the orifice in the bladder had ſubſided, ſo as to admit of the canula diſengaging itſelf, affords us a criterion in practice, of the proper time for withdrawing the canula, which may be done in thirty-ſeven hours, or as ſoon as ſuppuration comes upon the wound in the bladder."

When the bladder is to be *punctured from the perinæum*, the trocar, which ought to be longer than the one for puncturing above the pubes, is to be introduced at a little diſtance from the rapha perinæi, and then paſſed into the body of the bladder, a little to the upper and outſide of the proſtate gland, carrying the point of the inſtrument a little upwards, to avoid wounding the ends of the ureters or ſeminal veſſels. Puncturing from the anus, or the vagina in females, are attended with ſo many inconveniences that they ought never to be attempted.

CHAP. XXIX. ON THE VENEREAL DISEASE.

SECT. I. *Of the* GONORRHŒA.

1. *Deſcription.*] The firſt ſymptoms of this diſeaſe in men are commonly a ſenſation at the end of the penis not unlike a flea-bite,

together with a fulneſs of the lips of the urethra, and ſome degree of tenſion in the penis, the urinary canal feeling as if tightened, and the urine flowing in a ſmall and unequal ſtream: a little whitiſh mucus is to be ſeen about the orifice of the urethra, and oozing from it when lightly preſſed, eſpecially if the preſſure be made on the ſpot where the ſoreneſs is moſt felt. The diſcharge ſoon increaſes in quantity, and varies in its colour according to the degree of inflammation. The patient feels a ſenſation of heat and pain in evacuating his urine, particularly at certain ſpots of the urethra, and above all towards its orifice; and the involuntary erections to which he is ſubjected from the ſtimulus, particularly when warm in bed, occaſion a diſtortion or curvature of the penis, attended with exquiſite pain. When the inflammation is violent, the glans appears tumid and tranſparent, the tenſion extends through the whole of the penis, the perinæum is affected with ſwelling and redneſs, and even the loins, buttocks, and anus, ſympathize and afford a very uneaſy ſenſation. Sometimes the prepuce inflames about the end of the penis, and cannot be drawn back, occaſioning what is called a *phymoſis*; at other times, as in the *paraphymoſis*, it remains in an inflamed ſtate below the glans, ſo that it cannot be drawn forwards; and, if the ſtricture and inflammation be violent, may terminate in gangrene. Now and then, eſpecially when there is a phymoſis, we may perceive a hard chord extending along the back of the penis. This is an inflamed lymphatic, and may be conſidered as a prelude to a bubo. When, however, a bubo does appear, almoſt univerſally ſome ulceration is previouſly to be diſcovered about the præputium, or glans penis; which gives ground to preſume that ſome other contagious matter beſides that of gonorrhœa may have been applied to the urethra. For it is certain that matter capable of communicating the contagion of gonorrhœa to a female is often copiouſly applied to the whole glans penis of a male for ſeveral days together, without giving either ulceration or bubo.

In mild caſes, the ſeat of the diſeaſe is in the urethra, not far from its orifice; but it frequently happens that the virus inſinuates itſelf much higher up, ſo as to affect Cowper's glands, the proſtate, and parts very near to the neck of the bladder.

In the generality of caſes, the inflammation goes on increaſing for ſeveral days, commonly for a week or a fortnight; after which the ſymptoms begin to abate; and the running, when left to itſelf, gradually leſſens in quantity, and becomes whiter and thicker, till at length it wholly ſtops. The colour of the mucus, however, is by no means a certain guide in theſe caſes: for in many patients it is of a yellowiſh, and ſometimes of a greeniſh hue to the very laſt; but in general it becomes more conſiſtent towards the cloſe of the diſeaſe.

In *women*, the external parts of generation being fewer and more ſimple, the diſeaſe is leſs complicated than in men. Sometimes the vagina only is affected; and when this happens, the ſymptoms are very trifling: but in general it comes on with an itching and ſenſation of heat as in the other ſex; and is attended with inflammation of the nymphæ, inſide of the *labiæ*, *clitoris*, *carunculæ myrtiformes*, the orifice and ſometimes the whole of the *meatus urinarius*. Very often the deep-ſeated glands of the vagina are affected, and it is ſometimes difficult to diſtinguiſh the diſcharge of a gonorrhœa from that of the fluor albus.

2. *Cauſes*, &c.] Many ingenious arguments were, ſome few years ago, advanced to prove, that the gonorrhœa and the lues venerea are different affections, originating from two diſtinct ſpecies of virus; and this controverſy ſtill, perhaps, remains to be decided by future facts. Certain it is, that in nineteen of twenty caſes of gonorrhœa, no ſymptom whatever of ſyphilis appears; and that the diſeaſe readily admits of cure without having recourſe to thoſe remedies which are univerſally requiſite for combating the contagion of ſyphilis. It is by no means wonderful, that, in ſome caſes, both contagions, ſuppoſing them different, ſhould be communicated at the ſame time. Nay, caſes are by no means rare, where the contagion of itch, though eſſentially different from both, has been communicated with either. But as undeniable proof that the contagion in both caſes is preciſely the ſame, it has been alleged by ſome, that the matter of a chancre introduced into the urethra will generate a gonorrhœa, and that the diſcharge from a gonorrhœa will produce chancre, bubo, and every other ſymptom of ſyphilis. On the other hand, however, it is contended, that when experiments of this nature are conducted with the greateſt accuracy, the matter of ſyphilis uniformly produces ſyphilis, and that of gonorrhœa, gonorrhœa only. Without pretending to decide on which of theſe experiments the greateſt dependence is to be put, we may only obſerve, that while an almoſt inconceivable ſmall portion of ſyphilitic matter applied to the glans penis, from connection with an infected female, infallibly produce ſyphilis if it be not ſpeedily removed, the matter of gonorrhœa, in every inſtance of that diſeaſe, is applied to the whole ſurface of the glans penis for many days together without producing almoſt any bad effect whatever. From this, therefore, there is ground for inferring, either that it is not capable of being abſorbed, or if abſorbed it is innocent.

But while there have been diſputes with regard to the peculiar nature of matter in gonorrhœa, there have alſo been controverſies with reſpect to the ſource from whence it is derived. While ſome ſuppoſe it to be principally purulent matter ariſing from ulcerations, other aſſert that no ſuch ulceration is ever produced in the urethra by gonorrhœa. They contend, that the increaſed ſecretion in theſe caſes is exactly ſimilar to what happens in the catarrh. But the compariſon will by no means hold good in every particular; in the latter the whole membrane of the noſe is equally irritated; whereas in gonorrhœa, only particular parts of the urethra ſeem affected. The diſeaſe, in the generality of caſes, ſeldom extends more than half an inch or an inch along that canal, and in many is confined (at leaſt in the beginning) to a ſmall ſpot near the extremity of the glans. This diſcharge is produced from that part of the urethra where the pain is felt; and the patient, when he voids his urine, feels no ſmarting till it reaches the inflamed ſpot: but as the diſorder increaſes, the inflammation affects a greater number of points, juſt in the ſame manner as chancres affect different parts of the glans. It might be ſuppoſed that diſſection would at once clear up this matter, and put an end to the diſpute; but this is far from being the caſe. Dr. Simmons has ſeen ſeveral urethras opened in perſons who had a gonorrhœa at the time of their death: in three of them the ſurface of the urethra, as in the caſes related by Morgagni, appeared for ſome way down of a ſlight red colour, and in all of them was covered with mucus; but without any appearance of ulceration, except in two diſſections at Paris, in which moſt of the gentlemen preſent were convinced that they ſaw evident marks of it: but Dr. Simmons ſays that the appearances were to him not ſufficiently ſatisfactory to enable him to decide with certainty on the ſubject. On the other hand, when we conſider that the diſcharge in a gonorrhœa is ſometimes tinged with blood, and that when this happens a little blood-veſſel is no doubt ruptured, we can have no reaſon to doubt that an ulceration may, and ſometimes does, happen in theſe caſes; eſpecially as we often obſerve an excoriation near the orifice of the urethra. It is certain, that wherever there is conſiderable inflammation, there will be danger of ulceration. Beſides, from a neglected or badly-treated gonorrhœa, we often ſee fiſtulas *in perinæo*, and other ulcers of the urethra, penetrating through its ſubſtance, and affording a paſſage to the urine. And there can be no doubt that ſlight ulcerations of this canal often occur, and are afterwards perfectly obliterated, in a ſimilar manner to what happens in the papillæ of the tongue, the tonſils, &c. Such an obliteration will the more readily take place in a part like the urethra, defended with mucus, and not expoſed to the air, which is known to have no little effect in hardening a cicatrix.

But whether ulcers take place or not, whether the virus of gonorrhœa be preciſely of the ſame kind with that which gives ſyphilis, or of a different kind, there is reaſon from the phænomena of the diſeaſe to conclude, that the matter firſt acts by mixing with the mucus at the extremity of the urethra; and that from thence it is propagated upwards, particularly where the excretories of mucus are moſt numerous; and that on the parts to which it is applied, it operates as a peculiar irritating cauſe. The conſequences of this irritation will be inflammation and an increaſed ſecretion of the mucus; and ſo far the complaint will be local. In ninety-nine caſes of an hundred, a local affection of this kind conſtitutes the whole of the diſeaſe; and of this inflammation, ulcerations within the urethra, ſtrictures, and other local affections, may be the conſequence. But whether a diſeaſe of the habit ever takes place, unleſs when the contagion of ſyphilis is communicated with that of gonorrhœa, ſtill remains to be determined by future obſervations and experiments.

Nothing can be more variable than the period at which the diſeaſe makes it appearance after infection. Perhaps, at a medium, we may place it between the fourth and fourteenth day; but in ſome caſes it happens within twenty-four hours; and in others, not before the end of five or even ſeven weeks: neither of theſe extremes, however, are common.

From what has been ſaid of the manner in which the contagious matter in gonorrhœa acts, and of the influence it exerts on thoſe parts with which it comes in contact, it follows, that the prevention of gonorrhœa muſt depend on the removal of the contagious matter as ſoon as that can be done; and where this is either altogether neglected or not properly accompliſhed, that the cure muſt depend on counteracting the inflammation which this contagious matter excites, and the conſequences which reſult from it.

The firſt of theſe intentions may be moſt certainly and moſt eaſily accompliſhed by careful lotion of all the parts to which the contagious matter has any chance of being applied. Theſe parts, at leaſt on the firſt application of the matter, are readily acceſſible; for even in men there is no reaſon to believe that it at firſt penetrates to any extent in the urethra. This waſhing of the parts ſhould be performed as ſoon as poſſible; becauſe then the matter is both moſt acceſſible and leaſt involved with mucus; but although waſhing cannot be accompliſhed at an early period, it ſhould not be neglected afterwards; for from the diſeaſe uniformly commencing, even when it does not appear till a conſiderable time after the application of the contagious matter, with a peculiar ſenſe of titillation at the external parts, particularly in men at the extremity of the urethra, there is reaſon to believe that the contagious matter attached to the mucus may remain latent there for a conſiderable time. For the purpoſe of waſhing, with a view to the prevention of this diſeaſe, recourſe may be had to almoſt any watery fluid, provided it be not ſo ſtimulant as to produce bad effects from injuring the parts. Pure water, properly applied, is perhaps one of the beſt lotions; but there can be no doubt that its power in removing the contagious matter may be ſomewhat increaſed by ſuch additions as render it a more powerful ſolvent of mucus. With this intention, one of the moſt powerful additions is the vegetable alkali, either in its mild or cauſtic ſtate. In the latter ſtate it is the moſt active, but in the former it is moſt ſafe; and the *lixivia purificata* of the Edinburgh Pharmacopœia, to the extent of half a drachm, diſſolved in ſix or eight ounces of water, is one of the beſt lotions that can be employed. The purpoſe of removing the contagion may often alſo be effectually anſwered from waſhing with water impregnated with ſoap; for there the alkali, though in a cauſtic ſtate, is prevented from exerting any diſagreeable effects, in conſequence of its being combined with oily matters.

With the view of preventing gonorrhœa, ſome adviſed, that the alkali either in its mild or cauſtic ſtate properly diluted with water, ſhould be injected into the urethra: and there can be no doubt, that by this means the contagious matter, when it has entered the urethra, may be removed. A removal may alſo be effected by the injection of a weak ſolution of corroſive ſublimate, which ſeems to act not by diſſolving the mucus but by producing an augmented ſecretion. But at a very early period of the diſeaſe, injections are probably unneceſſary; and if it has made any conſiderable progreſs, they are dangerous: for from the augmented ſenſibility of the part, even very gentle ones are apt to excite a high degree of inflammation.

There are practitioners who, ſuppoſing that the body poſſeſſes powers to expel the virus, and that the diſeaſe has a certain period to run through its ſeveral ſtages of progreſs, acme, and decline, are for leaving the cure to nature; or at leaſt content themſelves with aſſiſting her by an antiphlogiſtic regimen, gentle evacuations, and the like.

That in many caſes the diſorder admits of a natural cure, there can be no doubt; the increaſed ſecretion of mucus carrying off the virus faſter than it is formed, till at length the infection is wholly removed: but it is equally certain that, in every caſe, by the application of ſuitable remedies to the inflamed parts, we may ſhorten the duration of the complaint, and abridge the ſufferings of the patient, with the ſame certainty and ſafety as we are enabled to remove the effects of an ophthalmia, or any other local inflammation, by proper topical applications. General remedies, ſuch as occaſional blood-letting, cooling diet, the liberal uſe of diluting liquors, and mild purges, are by all allowed to be uſeful, and even neceſſary. Aſtruc was of opinion, that in theſe caſes blood-letting ought to be repeated five or ſix times; and there are ſtill many practitioners who depend much on repeated evacuations of this ſort for a removal of the inflammation. But there is, perhaps, not one caſe in ten in which it is at all requiſite; and this ſmall number of caſes will conſiſt only of the ſtrong and plethoric; in ſuch, when the chordee is frequent and painful, and the pulſe hard and full, the loſs of from eight to twelve ounces of blood will be beneficial, but it will be ſeldom neceſſary to repeat the operation. The inflammation, in theſe caſes, is kept up by the local ſtimulus of the virus and the urine; and all that we can expect from venæſection is to moderate the pain, and the frequency of erection. In perſons of a delicate habit, and of an irritable fibre, the evacuation will do no good; but if repeated will certainly be liable to do harm, by increaſing irritability, and of courſe rendering the patient more ſuſceptible of ſtimulus.

The utility, and even the neceſſity, of a cooling regimen, are ſufficiently obvious; wine and ſpirituous liquors, ſpiceries, a fiſh-diet, much animal food, and ſalted and high-ſeaſoned diſhes of every ſort, will conſtantly add to the complaint. The patient ſhould eat meat only once a-day, and that ſparingly. He ſhould abſtain from hot ſuppers. Milk, mild vegetables, and fruit, ſhould conſtitute the principal part of his diet while the inflammatory ſymptoms continue. Every thing that tends to excite the venereal imagination ſhould be ſtudiouſly avoided; for whatever promotes erection of the penis, will increaſe the inflammation, and of courſe add fuel to the diſeaſe. For the ſame reaſons, much walking, or riding on horſeback, will be hurtful, from the irritation kept up in the perinæum by ſuch means. Violent exerciſe of any kind, or any thing that is liable to increaſe the heat and the momentum of the blood, will of courſe be improper.

The drinking freely of mild, cooling, mucilaginous liquors, ſuch as linſeed-tea, orgeat, whey, milk and water, almond emulſion, and the like, will be extremely uſeful, by diluting the urine, and preventing its ſalts from ſtimulating the urethra. When the heat and pain in making water are very conſiderable, mucilaginous ſubſtances are found to have the beſt effect, particularly the gum tragacanth. It is a common practice to give equal doſes of this gum, or gum-arabic and nitre, and to diſſolve nitre in the patient's drink, with a view to leſſen the inflammation. But in theſe caſes nitre is always improper: it is known to be a powerful diuretic, its chief action being upon the urinary paſſages; ſo that the ſtimulus it occaſions will only ſerve to increaſe the evil it is intended to alleviate. Cream of tartar, on account of its diuretic quality, will be equally improper. Our view here is not to promote a preternatural flow of urine; for the virus, being inſoluble in water, cannot eaſily be waſhed away by ſuch means; but our object ought to be to render the urine that is ſecreted as mild and as little ſtimulating as poſſible.

Mild purges, which conſtitute another material part of the general remedies, are no doubt extremely uſeful, when exhibited with prudence; but it is well known, that the abuſe of purgative medicines in this diſeaſe has been productive of numerous evils. Formerly it was a pretty general practice to give a large doſe of calomel at bed-time, three or four times a-week; and to work it off next morning with a ſtrong doſe of *pil. e colocynth.* or ſome other draſtic purge. This method was perſevered in for ſeveral weeks: in conſequence of which the patient often found himſelf troubled with an obſtinate gleet, and perhaps his conſtitution materially injured; the effect of ſuch a method being (eſpecially in irritable habits) to weaken the ſtomach and bowels, and lay the foundation of hypochondriac complaints. Violent purging, likewiſe, often occaſions ſtrangury, hernia humoralis, and other troubleſome ſymptoms.

The purges employed in theſe caſes ſhould be gentle; ſuch as Rochelle ſalt, manna, tartariſed kali, elect. ſennæ, ol. ricini, and the like. They ſhould be given only in a doſe ſufficient to procure two or three ſtools, and be repeated only every two or three days. The daily uſe of the purgative electuaries that are ſtill given by ſome practitioners, ſerves only to keep up a continual irritation in the bladder, and of courſe to prolong the inflammation.

The topical remedies that are uſed, conſiſt chiefly of different ſorts of injections, the ingredients of which are extremely various; but their modes of operation may, in general, be referred to their mucilaginous and ſedative, or to their detergent, ſtimulating, and aſtringent qualities. In the hands of ſkilful practitioners, great advantages may, doubtleſs, be derived from the uſe of theſe remedies; but, on the other hand, the improper and unſeaſonable adminiſtration of them may prove a ſource of irreparable miſchief to the patient.

We know that mucilaginous and oily injections will tend to allay the local inflammation; and that a ſedative injection, ſuch as a ſolution of opium, will leſſen the irritability of the parts, and of courſe produce a ſimilar effect; the utility of ſuch applications is, therefore, ſufficiently obvious.

A detergent injection, or one that will act upon the mucus of the urethra, increaſe the diſcharge of it, waſh it away, and with it the venereal virus that is blended with it, can only be uſed as a prophylactic before the ſymptoms of infection have made their appearance. But great circumſpection is neceſſary in the uſe of this kind of injection. If it be too weak, it can be of no efficacy; and if it be too ſtrong, it may prove dangerous to the patient. A ſuppreſſion of urine has been brought on by the improper uſe of an injection of this kind. When the ſymptoms of inflammation have once made their appearance, the ſtimulus of ſuch an injection muſt be extremely hazardous. Excoriation of the urethra has but too often been produced by remedies of this ſort in the hands of adventurous and unſkilful practitioners.

While the inflammation of the urethra continues, every thing that ſtimulates it muſt be hurtful. If the injection excites a painful ſenſation in the urethra, as is but too often the caſe, it will be liable to produce ſwelled teſticles, difficulty in making water, excoriation, and other effects of increaſed inflammation: if, by its aſtringency, the running be checked before the virus that excited the diſcharge be properly ſubdued, the patient will be expoſed to freſh dangers; and perhaps to a variety of local complaints, ſuch as obſtructions in the urethra, and abſceſſes *in perinæo*, which are well known to be ſometimes owing to applications of this ſort improperly managed.

When the inflammation has ſubſided, gently ſtimulating and aſtringent injections may be uſed with ſafety, and with conſiderable advantage: for as the inflammation is at firſt excited by the ſtimulus of the venereal virus, ſo when the former begins to leſſen, we may be aſſured that the activity of the latter has abated in proportion; and, in general, when the inflammatory ſymptoms are entirely removed, it will be found, that the mucus is no longer of an infectious nature, but is merely the effect of an increaſed ſecretion, and of relaxation. Mild aſtringents will therefore ſerve to brace and ſtrengthen the veſſels ſecreting mucus, and in this way will leſſen the diſcharge, and greatly promote the cure. It is certain, that in the greater number of caſes, a gonorrhœa which, if treated by internal remedies alone, would continue for five or ſix weeks, or longer, may, when judiciouſly treated with injections, be cured in a fortnight, and very often in leſs time. The great aim, therefore, of the practitioner ought to be, at firſt, to make uſe of ſuch injections only as will tend to lubricate the ſurface of the urethra, and to counteract and deſtroy the ſtimulus of the virus: as the inflammation abates, he may add ſome gently aſtringent preparation to a mucilaginous and ſedative injection; taking care that its aſtringency be ſuited to the ſtate of the diſeaſe, and to the irritability of the patient. Amongſt a great variety of ſubſtances, mercury, in different forms, is one of thoſe that is the moſt frequently employed in injections. All theſe mercurial injections have more or leſs of aſtringency; and, according to Dr. Simmons, it is ſolely to this property that we are to aſcribe their effects; for the idea of their correcting the venereal virus was originally introduced, and has, he thinks, been continued upon miſtaken principles.

Calomel, mixed with the mucus diſcharged in a gonorrhœa, has no more power in deſtroying the infectious properties of that mucus than ceruſe or any other preparation would have. A diluted ſolution of ſublimate injected into the urethra, will, like a ſolution of verdigriſe, or blue vitriol, or any other ſtyptic, conſtringe the mouths of the lacunæ; but this is all that it will do, for it will never leſſen the infectious nature of the virus. The ſame thing may be obſerved of crude mercury, extinguiſhed by means of mucilage, or of mercurial unction, blended with the yolk of an egg, and which, when thrown up into the urethra, will act nearly in the ſame manner as balſam of copaiva, or any other ſtimulating injection. The ſtimulus of calomel, however, has often been found of conſiderable efficacy; and in women, when the vagina only was affected, after waſhing the parts well, the cure has been accompliſhed by rubbing them repeatedly with mercurial ointment.

Having ſaid thus much on the nature and properties of different injections, we ſhall here offer to the practitioner's choice the following formulæ employed in the London hoſpitals:

(No. 87.) ℞ Aluminis gr. iv.
Aquæ roſæ ℥iv. Miſce fiat injectio.

In this and other injections for the gonorrhœa, the proportion of active materials is to be varied according to circumſtances, eſpecially in women, who will bear much more powerful remedies of this kind than men.

(No. 88.) ℞ Aquæ ammoniæ acetatæ ʒj.
Aquæ diſtillatæ ℥iij. Miſce fiat injectio.

(No. 89.) ℞ Mucilag. ſem. cydonii ℥iv.
Calomelanos ʒſs. Miſce fiat injectio.

At St. Bartholomew's hoſpital, an injection of calomel and mucilage of gum-arabic, in the proportions here ſtated, is employed.

(No. 90.) ℞ Pulv. ceruſſæ comp. ℈j.
Zinci vitriolati gr. vj.
Aquæ roſæ ℥iv. Miſce fiat injectio.

(No. 91.) ℞ Balſami copaibæ ʒij.
Mucilag. arabici gummi ℥ſs.
Aquæ calcis ℥iv. Miſce fiat injectio.

(No. 92.) ℞ Eruginis præp. gr. x.
Olei amygdalæ ℥iv.
Solve conterendo ut fiat injectio.

(No. 93.) ℞ Cupri vitriol. gr. iv.
Aquæ diſtillatæ ℥iv. Miſce fiat injectio.

(No. 94.) ℞ Hydrargyri purificati drach. j.
Mucilaginis arabici gummi ℥iſs.
Aquæ diſtillatæ ℥iſs. Fiat injectio.

(No. 95.) ℞ Aquæ diſtillatæ ℥viij.
Hydrargyri muriati gr. j. ad ij.
Solve, ut fiat injectio.

(No. 96.) ℞ Aquæ lithargyri acetati gutt. viij.
Aquæ roſæ ℥iv. Miſce fiat injectio.

(No. 97.) ℞ Aquæ diſtillatæ ℥iv.
Acidi muriatici gutt. viij. miſce.

This is uſed, with very good effect, in caſes of gonorrhœa, where the ſcalding of the urine proves a troubleſome ſymptom.

(No. 98.) ℞ Olei amygdalæ ℥iv.
Aquæ lithargyri acetati gutt. viij. Miſce fiat injectio.

(No. 99.) ℞ Aquæ diſtillatæ ℥iv.
Tinct. opii gutt. xl. Fiat injectio ſedativa.

(No. 100.) ℞ Zinci vitriolati gr. x.
Aquæ diſtillatæ ℥iv. Miſce fiat injectio.

Dr. Saunders recommends the following:

(No. 101.) ℞ Cupr. ammoniac. (Ph. Edin.) ʒj.
Aquæ roſæ ℥v.
Solve, et utatur, more ſolito, pro injectione.

(No. 102.) ℞ Oxymel. ærugin. ℥ſs.
Mellis roſæ ℥ij.
Decoct. hordei ℥iiiſs. Fiat injectio.

Dr. Fordyce gives us the following formulæ:

(No. 103.) ℞ Aq. fontis ℥viij.
Gum. arabic. ʒvj.
Calomel. ℥ſs. Miſce fiat injectio.
(No. 104.) ℞ Aq. roſæ ℥ij.
Ceruſſ. acetat. gr. v. ad x. Fiat injectio.
(No. 105.) ℞ Ol. olivæ ℥ij.
Hydrarg. (ſaliva vel mucilag. gum. arabic. extinct.)
ʒß. ad ℥iij. Fiat injectio.

As the gonorrhœa is only a local affection, it may be inferred, that the internal uſe of mercury is unneceſſary towards the cure. Very often, indeed, this complaint may be removed without having recourſe to mercurials. Sometimes patients have been met with, whoſe general health has been greatly impaired by a long-continued uſe of mercury in ſuch caſes, while the original diſeaſe, the gonorrhœa, was rendered much worſe by it. In ſome, it degenerated into a gleet, that was cured with extreme difficulty; in others it brought on a variety of diſtreſſing ſymptoms. In caſes of gonorrhœa, therefore, whenever mercury is adminiſtered, it ought to be, not with a view to expedite the cure, but merely to obviate the dangers of ſyphilis. When the infection is apparently ſlight, and the inflammation and the ſymptoms trifling, we may proceed without the aſſiſtance of mercury, eſpecially if the patient be of a weak, relaxed, and irritable habit, likely to be injured by mercurial medicines. On the other hand, when the diſcharge is violent, the inflammation conſiderable, or the ſeat of the diſeaſe high up in the urethra, it is, perhaps, the moſt prudent plan to give mercurials in ſmall doſes, and in ſuch forms as ſeem the beſt adapted to the conſtitution of the patient.

The *pilulæ hydrargyri*, as prepared according to the receipts in the laſt edition either of the London or Edinburgh Pharmacopœias, in both of which the mercury is rendered active merely by triture, may, perhaps, be conſidered as one of the mildeſt and moſt efficacious forms under which mercury can be exhibited by the mouth. Its efficacy will depend on its not irritating the bowels, and ſo paſſing off by ſtool; care muſt likewiſe be taken to prevent its affecting the mouth. Of the chemical preparations of mercury, the mildeſt and leaſt irritating is calomel. It may be given from gr. iß. to gr. iii. at bed-time, occaſionally interpoſing a mild purgative, to prevent it from ſalivating; but, in general, the mercurial pill juſt mentioned is to be preferred.

When there is no chancre nor bubo, no appearance, in ſhort, of ſyphilitic infection, it would be improper to adminiſter *muriated quickſilver*, *hydrargyrus calcinatus*, or any other of the more acrid preparations of mercury.

After a gonorrhœa proceeding from venereal cauſes has been removed, another kind of running, without pain, called the *go-*

norrhœa mucoſa, or *gleet*, ſometimes remains. Sometimes it ariſes from a conſtriction and excoriation of the urethra, and frequently it is the effect of an enlargement and diſeaſed ſtate of the proſtate. In each of theſe caſes, as the gleet is the effect of irritation, the cure will depend on the removal of the local diſeaſe that occaſions it. But there is another ſpecies of gleet, that ſeems to depend on relaxation. It is in general free from infection, and is moſt common in thoſe who have had long and frequent gonorrhœas. It is likewiſe the effect of a debilitated habit, from ſevere purging, or a long-continued uſe of mercurials. A diſcharge of this kind is more frequent in women than in men; or, at leaſt, the *fluor albus*, after a gonorrhœa, will often be miſtaken for a gleet.

When there is no reaſon to ſuſpect remaining contagion, aſtringent injections will be of the greateſt ſervice. It will be neceſſary, at the ſame time, to attend to the health of the patient, by employing the Peruvian bark, chalybeate waters, cold bathing, and ſuch other remedies as will tend to ſtrengthen the ſyſtem: and indeed by the uſe of theſe, particularly by the Peruvian bark, ſuch runnings are often ſucceſsfully combated in thoſe who, from apprehenſions of dangerous conſequences, cannot be prevailed upon to employ injections. When there is no tendency to inflammation, balſam of copaiva may be preſcribed with advantage in free doſes. Dr. Simmons ſays he once ſaw a complaint of this ſort removed by applying a bliſter to the perinæum, after it had reſiſted a variety of other remedies. In the Medical Obſervations alſo we have an account of a gleet and incontinence of urine removed at once by a bliſter to the os ſacrum. In general, however, the other methods above mentioned will be ſufficient to remove it, though ſometimes it will continue for a long time in ſpite of all our endeavours to check it. Other kinds of gonorrhœa, in which the ſemen itſelf is ejected, eſpecially during ſleep, may be cured by tonics and a mild cooling regimen, as has been noticed in its proper place.

SECT. II. *Of the* LUES VENEREA.

1. *Hiſtory.*] Dr. Aſtruc, who writes a very accurate hiſtory of the lues venerea, is fully convinced that it is a new diſeaſe, which never appeared in Europe till ſome time between the years 1494 and 1496, having been imported from America by the companions of Chriſtopher Columbus; though this opinion is not without its opponents. Dr. Sanches in particular has contended, with much learning and ability, that it appeared in Europe at a much earlier period: but it is at leaſt certain, that it was altogether unknown to the medical practitioners of Greece and Rome, and that it was a very common diſeaſe in America when the Europeans firſt viſited that country. But at whatever period it may have been

introduced into Europe, or from whatever ſource it may have been obtained, there can be no doubt that, as well as ſmall-pox or meaſles, ſyphilis depends on a peculiar ſpecific contagion; or a matter *ſui generis*, which is alone capable of inducing this diſeaſe.

The venereal infection, however, cannot, like the contagious miaſmata of the ſmall-pox and ſome other diſeaſes, be carried through the air, and thus ſpread from place to place: for, unleſs it be tranſmitted from the parents to the children, there is no other way of contracting the diſeaſe but from actual contact with the infectious matter. Thus, when a nurſe happens to labour under the diſeaſe, the infant that ſhe ſuckles will receive the infection; as, on the other hand, when the child is infected, the nurſe is liable to receive it: and there have even been inſtances known of lying-in women being infected very violently, from having employed a perſon to draw their breaſts who happened to have venereal ulcers in the mouth. It may be caught by touching venereal ſores if the cuticle be abraded or torn; and in this way accoucheurs and midwives have ſometimes been infected ſeverely. Dr. Macbride ſays, the moſt inveterate pox he ever ſaw was caught by a midwife, who happened to have a whitlow on one of her fingers when ſhe delivered a woman ill of the lues venerea.

But by far the moſt ready way of contracting this diſeaſe is by coition, the genital parts being much more bibulous than the reſt of the body. When the diſorder is communicated, the places where the morbific matter enters are generally thoſe where it firſt makes its appearance; and as coition is the moſt uſual way of contracting it, ſo the firſt ſymptoms commonly appear on or near the pudenda.

2. *Diagnoſis.*] The patient's own account will, for the moſt part, help us to diſtinguiſh the diſeaſe: but there are ſometimes caſes wherein we cannot avail ourſelves of this information, and where, inſtead of confeſſing, the parties ſhall conceal all circumſtances; while, on the other hand, there are now and then people to be met with, who perſuade themſelves that ſymptoms are venereal, which in reality are owing to ſome other cauſe: and therefore it is of the utmoſt importance to inform ourſelves thoroughly of the nature of thoſe ſymptoms and appearances which may be conſidered as pathognomic ſigns of lues venerea.

In the firſt place, when we find that the local ſymptoms, ſuch as chancres, buboes, phymoſis, and the like, do not give way to the uſual methods; or when theſe complaints, after having been cured, break out again without a freſh infection; we may juſtly ſuſpect that the virus has entered the whole maſs of fluids: but if, at the ſame time, ulcers break out in the throat, and the face is deformed by callous tubercles, covered with a brown or yellow ſcab, we may be aſſured that the caſe is now become a confirmed lues, which will require a mercurial courſe.

When eruptions of the furfuraceous and ſuperficial kind are venereal, they are not attended with itching; and the ſcale being picked off, the ſkin appears of a reddiſh brown, or rather copper-colour, underneath; whereas leprous eruptions are itchy, throw off a greater quantity of ſcales, and riſe in greater blotches, eſpecially about the joints of the knees and elbows. Venereal tubercles or puſtules are eaſily diſtinguiſhed from carbuncles of the face, by not occupying the cheeks or the noſe, nor as having a purulent apex, but are covered at top, either with a dry branny ſcurf like the ſuperficial eruptions juſt now mentioned, or elſe with a hard dry ſcab of a tawney yellow hue; they particularly break out among the hair or near to it on the forehead or on the temples.

Venereal ulcers affecting the mouth are diſtinguiſhed from thoſe which are ſcorbutic in the following manner: 1. Venereal ulcers firſt affect the tonſils, fauces, and uvula; then the gums, but theſe very rarely: on the contrary, ſcorbutic ulcers affect the gums firſt of all; then the fauces, tonſils, and uvula. 2. Venereal ulcers frequently ſpread to the noſe; ſcorbutic ones almoſt never. 3. Venereal ulcers are callous in the edges; ſcorbutic ones are not ſo. 4. Venereal ulcers are circumſcribed, and, for the moſt part, are circular, at leaſt they are confined to certain places; ſcorbutic ones are of a more irregular form, ſpread wider, and frequently affect the whole mouth. 5. Venereal ulcers are for the moſt part hollow, and generally covered at bottom with a white or yellow ſlough; but ſcorbutic ones are more apt to grow up into looſe fungi. 6. Venereal ulcers are red in their circumference, but ſcorbutic ones are always livid. 7. Venereal ulcers frequently rot the ſubjacent bones, ſcorbutic ones ſeldom or never. 8. And, laſtly, Venereal ulcers are moſtly combined with other ſymptoms which are known to be venereal; ſcorbutic ones with the diſtinguiſhing ſigns of the ſcurvy, ſuch as difficult breathing, liſtleſſneſs, ſwelling of the legs, rotten gums, &c.

Another ſure ſign of the confirmed lues is often afforded from certain deep-ſeated nocturnal pains, particularly of the ſhins, arms, and head. As for any ſuperficial wandering pains that have no fixed ſeat, and which affect the membranes of the muſcles and ligaments of the joints, they, for the moſt part, will be found to belong to the gout or rheumatiſm, and can never be conſidered as venereal unleſs accompanied with ſome other evident ſigns; but with regard to the pains that are deeply ſeated, and always fixed to the ſame place, and which affect the middle and more ſolid part of the ulna, tibia, and bones of the cranium, and rage chiefly and with greateſt violence in the forepart of the night, ſo that the patient can get no reſt till morning approaches, theſe may ſerve to convince us that the diſeaſe has ſpread itſelf throughout the whole habit, whether they be accompanied with other ſymptoms of the lues or not.—*Gummata* in the fleſhy parts, *nodes* in the perioſteum, *ganglia* upon the tendons, *tophi* upon the ligaments, *exoſtoſes* upon the bones, and *fici* at the verge of the anus, are all of them ſigns of the confirmed lues: theſe are hard indolent ſwellings; but as they ſometimes ariſe independently of any venereal infection, and perhaps may proceed from a ſcrofulous taint, unleſs they be accompanied or have been preceded by ſome of the more certain and evident ſymptoms of the lues, we muſt be cautious about pronouncing them venereal. When theſe ſwellings are not owing to the ſyphilitic virus, they are very ſeldom painful, or tend to inflame and ſuppurate; whereas thoſe that are venereal uſually do, and if they lie upon a bone generally bring on a caries.

Theſe carious ulcers are moſt commonly met with upon the ulna, tibia, and bones of the cranium; and when accompanied with nocturnal pains, we can never heſitate about declaring their genuine nature. Frequent abortions, or the excluſion of ſcabby, ulcerated, half-rotten, and dead fœtuſes, happening without any manifeſt cauſe to diſturb the fœtus before its time, or to deſtroy it in the womb, may be reckoned as a ſure ſign that at leaſt one of the parents is infected.

Theſe, then, are the principal and moſt evident ſigns of the confirmed lues. There are others which are more equivocal, and which, unleſs we can fairly trace them back to ſome that are more certain, cannot be held as ſigns of the venereal diſeaſe.—Such are, 1. Obſtinate inflammations of the eyes, frequently returning with great heat, itching, and ulceration of the eye-lids. 2. A ſinging and hiſſing noiſe in the ears, with ulcers or caries in the bones of meatus auditorius. 3. Obſtinate head-achs. 4. Obſtinate cutaneous eruptions, of the itchy or leprous appearance, not yielding to the milder methods of treatment. 5. Swellings of the bones. And, 6, Wandering and obſtinate pains. None of theſe ſymptoms, however, can be known to be venereal, except they happen to coincide with ſome one or other of the more certain ſigns.

It may, perhaps, be conſidered as a ſingularity in this diſeaſe, that the diagnoſis is often more difficult in the advanced than in the early periods of the affection. That is, with thoſe who have been certainly ſubjected to ſyphilis, it is often very difficult to ſay whether certain ſymptoms remaining after the ordinary modes of cure have been employed, be ſyphilitic or not. Very frequently, as appears from the ſequel, nocturnal pains, ulcerations, and the like, remaining after a long courſe of mercury has been employed, are in no degree of a venereal nature, but are in reality to be conſidered as conſequences rather of the remedy than of the diſeaſe; and are accordingly beſt removed by nouriſhing diet, gentle exerciſe, and tonics. But as long as any ſymptoms of any kind remain, it is often impoſſible to convince ſome patients that they are cured; and it is often impoſſible for a ſurgeon with certainty to affirm that the diſeaſe is altogether overcome.

Upon the whole, we are firſt to diſtinguiſh and conſider the ſeveral ſymptoms apart; and then, by comparing them with each other, a clear judgment may be formed upon the general review.

3. *Prognoſis.*] Being thoroughly convinced that the caſe is venereal, we are to conſider, *Firſt*, whether it be of a longer or ſhorter date; for the more recent it is, it will, *cæteris paribus*, be leſs difficult to remove. *Secondly*, whether the age, ſex, and conſtitution of the patient are favourable, or otherwiſe, to the exhibition of mercury; for unleſs the patient have ſtrength of body ſufficient to endure the diſturbance it excites in the ſyſtem, the diſeaſe will go on, rather aggravated than reſiſted by the treatment, to a fatal termination. Hence it is, that people of a ſcorbutic or ſcrofulous habit contracting venereal diſorders, have the ſymptoms always remarkably violent, and difficult to cure. And, for the ſame reaſons, the confirmed lues is much more to be dreaded in a perſon already inclined to an aſthma, phthiſis, dropſy, gout, or any other chronic diſeaſe, than in one of a ſound and healthy conſtitution. For as the original diſeaſe is increaſed by the acceſſion of the venereal poiſon, ſo the lues is aggravated in conſequence of the danger of employing mercury in a proper quantity, or elſe from the want of that vigour in the ſyſtem, without which, we know by experience, that remedy is of no avail. The more numerous the ſymptoms, and the more they affect the bones, the more difficult the cure. Of all combinations, however, the union of *ſyphilis* with *ſcrofula* is, perhaps, the moſt difficult to overcome: but if the acrimony ſhould ſeize on the nobler internal parts, ſuch as the brain, the lungs, or the liver, then the diſeaſe becomes incurable, and the patient will either go off ſuddenly in an apoplectic fit, or ſink under a conſumption.

4. *Cure.*] Viewing this diſeaſe as depending on a peculiar contagious matter introduced into the ſyſtem, and multiplied there, it is poſſible to conceive that a cure may be obtained on one of three principles; either by the evacuation of the matter from the ſyſtem, by the deſtruction of its activity, or by counteracting its influence in the ſyſtem. It is not impoſſible that articles exiſt in nature capable of removing this complaint on each of theſe grounds: but we may venture at leaſt to aſſert, that few ſuch are yet diſcovered. Notwithſtanding numbers of pretended infallible remedies for ſyphilis, mercury is, perhaps, the only article on which dependence is placed among European practitioners; and with regard to its mode of operation, all the three different opinions pointed out have been adopted and ſupported by different theoriſts. But although many ingenious arguments have been employed in ſupport of each, we are, upon the whole, more inclined to think it probable that mercury operates by deſtroying the activity of the venereal virus, than that it has effect either by evacuating it, or by exciting a ſtate of action, by which its influence is counteracted.

Some practitioners have affirmed, that the diſeaſe may be totally extirpated without the uſe of mercury: but, excepting in ſlight caſes, it appears from the moſt accurate obſervations, that this grand ſpecific is indiſpenſable; whether it be introduced through the pores of the ſkin, in the form of ointments, plaſters, waſhes, &c.; or given by the mouth diſguiſed in the different ſhapes of pills, troches, powders, or ſolutions.

Formerly it was held as a rule, that a *ſalivation* ought to be raiſed, and a great diſcharge excited. But this is now found to be unneceſſary: for as mercury probably acts by ſome ſpecific power in ſubduing and correcting the venereal virus, all that is required is to throw in a ſufficient quantity for this purpoſe; and if it can be *diverted* from the ſalivary glands ſo much the better, ſince the inconveniences attending a ſpitting are ſuch as we ſhould always wiſh to avoid.

In employing quickſilver in venereal caſes, there is reaſon to believe, that a preference is due to it in its moſt ſimple ſtate. In this way, its particles are minutely divided, and not being combined with any acid, as in the caſe of the more elaborate preparations, its uſe in diſeaſes is unattended with thoſe inconveniences for which the latter have been very juſtly complained of.

The London college have given the following formulæ:

(No. 106.) ℞ Hydrargyri purificati,
Extracti glycyrrhizæ, mellis craſſitudinem habentis, ſing. ʒij.
Glycyrrhizæ in tenuem pulverem triti ℥j.

The quickſilver being divided by triture with the extract, the powdered liquorice is to be added.

The late Dr. Kirkland employed the following, under the name of the *quickſilver pill:*

(No. 107.) ℞ Hydrargyri purificati ℥j.
Mucilaginis arabici gummi ʒiij.
Amyli in pulverem triti q. ſ.
Fiant pilulæ cxx. Doſis j. ad iij. mane et nocte.

Dr. Fordyce directs the following:

(No. 108.) ℞ Hydrargyri ℥j.
Terebinth. venet. ʒiſs.
Terantur ſimul, quamdiu guttula Hydrargyri appareat, addendo guttas aliquot olei terebinthinæ, ſi opus ſit.
Dein cum q. ſ. pulv. glycyr. fiant pilulæ lxxx. capt. j. vel ij. mane et veſp.

(No. 109.) ℞ Hydrarg. purif. gr. x.
Sacchari non purif. ℈j.
Conſ. cynoſb. q. ſ.
Fiat bolus omni nocte ſumendus.

The quickſilver and mucilage are to be rubbed together, and the ſtarch added by little and little, till the globules are extinguiſhed, and the whole forms one uniform maſs.

The proceſs, conducted in this way, is much more expeditious than the foregoing, and there is leſs chance of the revivification of the quickſilver. Four grains of mercury are contained in each pill.

(No. 110.) ℞ Hydragyri purif. gr. x.
Conſ. roſæ rub. ℈j.
Tere ſimul donec globuli viſum effugerint, et fiat bolus hora ſomni ſumendus.

Quickſilver, when combined with the action of mineral acids, has its activity prodigiouſly increaſed; hence the great variety of chemical preparations of this kind which have been contrived.

They have all of them been found capable of curing the diſeaſe, though by no means with equal facility in all inſtances. On the contrary, practitioners find it very often a matter of indiſpenſable neceſſity to change the preparation employed for ſome other; a circumſtance which ought to put us on our guard not to perſiſt obſtinately in the uſe of any one preparation, merely becauſe we have been accuſtomed to ſucceed with it in ſimilar caſes.

We ſhall here inſert, from the books of the different hoſpitals in London, formulæ which include the ſeveral preparations, and which are directed, internally, in the cure of ſyphilis.

(No. 111.) ℞ Hydrargyri acetati ʒj.
Medullæ panis ʒij.
Fiant pilulæ lx. Doſis ij. ad v. omni nocte.

(No. 112.) ℞ Hydrargyri præcipitati cinerei ʒj.
Conſervi cynoſbati q. ſ.
Fiant pilulæ lx. Doſis j. ad iij. mane et nocte.

(No. 113.) ℞ Hydrargyri vitriolati
Opii. ſing. ʒj.
Syrupi ſimplicis q. ſ.
Fiant pilulæ lx. Doſis j. ad iij. omni nocte.

(No. 114.) ℞ Calomelanos ʒj.
Pulveris *opiati* (Ph. Lond.) ℥iii.
Syrupi ſimplicis q. ſ.
Fiant pilulæ lx. Doſis ij. and iv. mane et nocte.

(No. 115.) ℞ Calomelanos gr. v.
Opii in pulv. trit. gr. j.
Conſ. cynoſbat. q. ſ.
Fiat pilula omni nocte ſumenda.

(No. 116.) ℞ Calomelanos ʒj.
Antimonii tartariſati gr. xv.
Opii purificati ʒſs.
Syrupi ſimplicis q. ſ.
Fiant pilulæ lx. Doſis j. ad iij. omni nocte.

Dr. Fordyce ſays, whatever preparation we employ, we ſhould give it in ſuch a manner, and in ſuch a doſe, as to produce hardneſs, fulneſs, and moderate frequency of the pulſe, with as little ſenſible evacuation as poſſible; for the mercury cures ſooner, and with greater certainty, when the ſtrength is but little, than when it is greatly reduced by it. Therefore, unleſs the caſe be very urgent, we are to begin with ſmall doſes at firſt, and afterwards gradually to increaſe them; giving opium and antimony, and now and then a ſmall doſe of rhubarb, if the inteſtines are affected; and omitting the medicine for two or three days, if there be ſymptoms of ſalivation, till theſe are gone off.

If any of the above preparations ſhould purge the patient, the doctor recommends,

(No. 117.) ℞ Opii gr. $\frac{1}{3}$ ad gr. j.
Antim. tart. gr. $\frac{5}{3}$ ad gr. ſs.
Miſce fiat pilula capt. mane et veſp.

Muriated quickſilver, known heretofore by the name of *corroſive ſublimate*, is one of the moſt active of all the mercurial preparations, inſomuch as not to be given but in very ſmall doſes. It therefore cannot very well be employed in ſubſtance; but muſt be diſſolved in order to render it capable of a more minute diviſion. We may ſee, by looking into Wiſeman, that this is an old medicine, though ſeldom given by regular practitioners. How it came to be introduced into ſo remote a part of the world as Siberia, is not eaſily found out; but Dr. Clerc, author of the *Hiſtoire Naturelle de l'Homme Malade*, aſſures us, that this remedy has been uſed there time out of mind.

It appears to have been totally forgotten in other places, until ſome years ago, when the Baron Van Swieten brought it into vogue; ſo that at one period, if we credit Dr. Locher, they uſed no other mercurial preparation at Vienna. The number of patients cured by this remedy alone, in the hoſpital of Saint Mark, which was under the care of this gentleman, from 1754 to 1761 incluſive, being 4880. They prepared the ſolution by diſſolving as much ſublimate in any kind of ardent ſpirit (at Vienna they uſed only corn-brandy) as gave half a grain to an ounce of ſolution. The doſe to a grown perſon was one ſpoonful mixed with a pint of barley-water, morning and evening.

We find in the Pharmacopœias of St. Bartholomew's and St. Thomas's hoſpitals, in London, the following modes of exhibiting muriated quickſilver:

(No. 118.) ℞ Hydrarg. muriat. gr. viij.
Ammoniæ muriatæ ʒij.
Aq. diſtillat. lib. j.
Solve et cola. Doſis uncia dimidia bis die.

(No. 119.) ℞ Hydrarg. muriat. gr. viij.
Sp. vinoſi ten. lib. j. M.
Doſis cochleare unum ex aqua hordeata bis die.

Dr. Saunders gives the following:

(No. 120.) ℞ Hydrarg. muriat. gr. iv.
Ammoniæ muriat. gr. viij.
Sp. vinoſ. ten. ℥ij.
Solve, et ſolutionis detur cochleare minimum bis de die ex decocti hordei cyatho.

(No. 121.) ℞ Hydrarg. muriat. *mit.* gr. x.
Opii purif. gr. v.
Conſ. aurant. cort. q. ſ.
Sint pilulæ decem, quarum detur una omni nocte.

But though extenſive trials of this preparation were made, as well on the Continent as in Great Britain and Ireland, it appears by no means an infallible remedy. On the contrary, as Sir John Pringle obſerves, it was ſeldom if ever found to perform a radical cure, and the frequent uſe of it proved in many caſes highly prejudicial. Dr. Fordyce ſays, the compounds of mercury and acids are uncertain remedies, and ought never to be uſed, unleſs the patient be in a ſituation where he runs the greateſt riſque of catching cold. When the hydrargyrus muriatus is given, it may be in the following form:

(No. 122.) ℞ Sp. vini dilut. (Ang. *proof-ſpirit* dicti) ℥ſs.
Hydrarg. mur. gr. ſs. ad gr. j.
Solve. capt. mane et veſp.

The uſe of ſublimate at length was ſucceeded in practice, even at Vienna, by mercury exhibited in other forms; and among theſe by a remedy firſt recommended by Dr. Plenck, and ſince improved by Dr. Saunders; conſiſting of mercury united with mucilage of gum-arabic, which is ſaid to render its exhibition perfectly mild and ſafe. It is thus deſcribed in the Pharmacopœia Chirurgica, under the name of *ſyrupus hydrargyri:*

(No. 123.) ℞ Hydrargyri purificati ʒj.
Pulveris arabici gummi ʒiij.
Syrupi ſimplicis ℥ij.
Aquæ fumariæ ℥j.

The quickſilver being rubbed down with the gum and the ſyrup, the rain-water is to be afterwards added. From two to three tea-ſpoonfuls are given night and morning.

Of a nature analogous to the foregoing is the *hydrargyrus calcinatus*, exhibited in the London hoſpitals in the following way:

(No. 124.) ℞ Hydrargyri calcinati
Opii purificati
Camphoræ ſing. ʒj.
Syrupi ſimplicis q. ſ.
Fiant pilulæ lx. Doſis j. vel ij. omni nocte.

(No. 125.) ℞ Hydrargyri calcinati gr. x.
Pil. opii (Ph. Lond.) ʒj.
Mucil. gum. arabic. q. ſ.
Fiant pil. xx. Doſis j. ad iij. omni nocte.

Dr. Fordyce directs this preparation in the following way:

(No. 126.) ℞ Hydrarg. calcinat. gr. j. ad iij.
Extract. gentian. q. ſ.
Fiat pilula capt. veſp.

Dr. Hugh Smith recommends the following:

(No. 127.) ℞ Hydrarg. calcinat. gr. j. ad iij.
Sulphur. antimon. præcip. gr. ij. ad iv.
Opii purif. gr. ß. ad gr. j.
Conſerv. cynoſbat. q. ſ.
Fiat Bolus omni noct. hor. decubitus ſumendus.

Another mode of affecting the conſtitution with mercury is *Fumigation.* This was much practiſed by the celebrated Aſtruc, and has ſince been revived in France by Lalonette. Mr. Abernethy, who, in his Surgical Caſes, p. 194, gives the following account of the uſe of Mercurial Fumigations, profeſſes his approbation of that practice. He preſents his readers with ſome caſes which clearly ſhew the advantages that attend this method of treating Lues Venerea. The grounds of preference in favour of fumigation are, "*Firſt*, from its affecting the conſtitution when other means have failed; and, *Secondly*, from its producing its effects in a much ſhorter time than any other mode requires.

"I beg leave, however, previouſly to obſerve," ſays Mr. Abernethy, "that the term, mercurial fumigations, is apt to excite wrong ideas of this method in the minds of ſurgeons. Fumigations have been, of late, generally employed to correct local diſeaſes; and they have often, by deſign, been made of an acrid quality. And even when they were formerly employed with a view of affecting the conſtitution, it was at a time when the chemical compounds of quickſilver were not underſtood, and ſufficient attention was not paid to thoſe circumſtances on which the ſucceſs of their application depends.

"But, in the year 1776, the Chevalier Lalonette, a phyſician at Paris, laid before the public an account of a new mode of mercurial fumigation, free from the inconveniences of former ones, and which, in the ſpace of thirty-five years, he had ſucceſsfully employed in more than four hundred caſes, that had reſiſted all the ordinary methods of cure. His method conſiſted in encloſing the patient, previouſly undreſſed, in a kind of box reſembling a ſedan chair, with an opening at the top to let out the head, and another at the bottom, to which was fitted a ſmall grate or furnace, having in it a heated iron for converting the mercurial remedy into fume. The preparation he made uſe of was a kind of calomel, which, by repeated ſublimation from iron-filings, was ſo far deprived of its muriatic acid, as to be in part reduced into running quickſilver; and, while it poſſeſſed conſiderable volatility, was perfectly irritating. Some of this powder being ſtrewed upon the hot iron placed below, was immediately converted into ſmoke, which fur-rounded the patient's body, and after ſome time ſettled on his ſkin in the form of a white and very fine calx of quickſilver: a complete dreſs, having its inner ſurface fumigated with the ſame powder, was then put on. The remedy being thus generally applied to the mouths of the cutaneous abſorbents, ſoon got admiſſion into the circulating fluids; and the conſtitution became thereby more ſpeedily affected than by any other proceſs known before."

For a more particular account of the chemical preparations uſed by M. Lalonette, and his manner of employing them, we are referred to his treatiſe, which was publiſhed in 1776.

With regard to the proceſs, Mr. Abernethy further obſerves, that the feelings of the patient during it, are not at all unpleaſant, provided the heat be properly regulated; that there is nothing uncleanly or diſagreeable in the powder applied to the ſkin; and that all who have had an opportunity of comparing it with the common method of inunction, have been highly pleaſed with the ſuperior advantages attending it. The following caſe is next related:

Caſe I. "In September, 1778, a young man had both his tonſils affected with venereal ulceration. This complaint came on after a bubo; and a great deal of mercury had been given for it without effect; for, being naturally healthy, and his bowels not eaſily diſturbed, he had taken, on an average, from two to three grains of calcined quickſilver, or calomel joined with opium, every day for three months; and had alſo uſed mercurial ointment during the ſame period, beginning with two drachms, and gradually increaſing it to an ounce daily: beſides which, he had for a ſhort time taken a ſolution of hydrargyrus muriatus. Yet all this ſcarcely produced any ſoreneſs of his gums, or cauſed any viſible amendment in the ulcers of his throat; the only effect it had, being that of preventing them from becoming worſe. His bowels indeed were occaſionally diſturbed by the medicines, but were eaſily quieted by opium. To rub in the quantity of mercurial ointment uſed towards the latter part of the courſe, the patient ſpent nearly an hour and a half every night and morning; but as he became weaker, he perſpired conſiderably in conſequence of this exerciſe, which tended to fruſtrate his endeavours by preventing, or at leaſt greatly diminiſhing, the abſorption of the medicine.

"No ground being gained by purſuing this plan, Mr. Blicke recommended mercurial fumigation according to Lalonette's method, which he had occaſionally employed with ſucceſs, and which would not only relieve the patient from the fatigue of rubbing in the ointment, but prevent any further irritation of his bowels, by ſuperſeding the internal uſe of mercury. The patient was accordingly expoſed, for half an hour each night, to the fumes produced from half an ounce of the powder already deſcribed; by which means, in leſs than a fortnight, his conſtitution and mouth became properly affected by the mercury; the ulcers healed ſoon afterwards; and in leſs than a month he was permitted to diſcontinue the remedy." Mr. Abernethy then ſays,

" I could relate many other caſes in which fumigation accompliſhed, with facility, the cure of complaints which had reſiſted long-continued mercurial courſes both by friction and internal exhibition; but I have ſelected this, as being rather a ſtriking example of the difficulty which we ſometimes experience, of introducing into the ſyſtem, in the ordinary modes, a ſufficient quantity of mercury to affect the conſtitution. It is reaſonable to think, that this object will be more certainly obtained by the abſorption thus taking place from almoſt the whole ſurface of the body, than by any other method hitherto deviſed. Yet it is but right to ſay, that my hopes of ſucceſs from it have not always been fulfilled; and that, in ſome few caſes where mercury ſhewed a particular tendency to act on the bowels without affecting the mouth, the mercurial fumes ſeemed to produce this effect even ſooner than the ointment had done: and in one young man, whoſe mouth neither frictions nor the internal uſe of mercury could be made to affect, but in whom they occaſioned conſtant tremors of the muſcles, and ſpaſms of the bowels, the fumigations were not attended with any better ſucceſs. Happily, however, ſuch caſes are rare; and in general the fumigations affect the conſtitution ſpeedily, and in the uſual manner.

" The remarkable benefit reſulting from this method of fumigation in the caſe mentioned above, rendered me very ſolicitous to introduce the practice of it into the hoſpital. I accordingly got a quantity of the powder prepared at the laboratory; and by uſing it rather more liberally than M. Lalonette directs, I found that I could in a very ſhort time completely affect the conſtitution; a circumſtance which I conſider as a very important advantage attending this mode of employing quickſilver. Although I had ſatisfied myſelf both of the ſpeedy and effectual operation of the medicine, exhibited in this manner, I did not, however, perſiſt in its uſe; for I judged, that though the experiment ſhould prove harmleſs, it could not be proper to excite a ſudden and powerful conſtitutional affection by this mineral, where neither the obſtinacy of the caſe, nor the rapid progreſs of the diſeaſe particularly called for it."—Out of ſix caſes of which Mr. Abernethy took notes, he relates only one, to ſhew how quickly, by this mode, the medicine can be made to operate.

The fumigating powder of Lalonette being a very operoſe and expenſive preparation, and having no advantage over one made by abſtracting the muriatic acid from calomel, Mr. Abernethy employed the following in lieu of it: " Two drachms of aqua ammoniæ are added to ſix ounces of diſtilled water, and four ounces of calomel are thrown into this liquor, and ſhaken up with it; the powder is afterwards ſeparated by a filter, and dried."

" The powder thus obtained," ſays he, " is of a grey colour, and contains a good deal of quickſilver in its metallic ſtate, which of courſe is extremely volatile, but becomes oxydated when raiſed into fume, and afterwards condenſes into a white and very fine duſt.

" This mode of uſing mercury is not, however, ſo well adapted to hoſpital practice; for ſometimes the iron was too much heated, and the patients were made by this means to perſpire profuſely, ſo that the powder was formed into a paſte, which was irregularly incruſted on the ſkin; beſides, the patients could not or would not wear a complete under-dreſs; and in that caſe the powder was wiped away, and the plan of treatment fruſtrated: for the deſign is to allow of a conſtant abſorption of this ſubtile preparation of quickſilver from the whole ſurface of the body.

Case II. " A young woman, twenty-five years of age, was admitted into the hoſpital, with chancres and a venereal ſore throat. Both tonſils were enlarged, and on each there appeared a deep ulcer about the breadth of a ſhilling, having white irregular edges. On the 19th of December, half an ounce of the powder was uſed at one fumigation; which treatment was again repeated with the ſame quantity on the night of the 20th, and both on the night and morning of the 21ſt. As ſhe then complained of head-ach and faintneſs, the fumigation was diſcontinued. On the 23d, her gums were much ſwelled and very ſore: the prominent margins of the ulcers in her throat had ſubſided greatly, and the ſurface of the tonſils now hardly appeared to be ulcerated. During the three following days, the ſoreneſs of the mouth increaſed, and in that time the ulceration in the throat had become ſcarcely viſible: the chancres alſo were healing faſt. On the 27th, two drachms of the powder were uſed in fumigation; and the next day ſhe was ſeen by all the ſurgeons of the hoſpital, who agreed that her mouth was too ſore to juſtify the continuance of the remedy.—On the 1ſt of January, her mouth remained properly ſore; the chancres were quite healed; and only a ſlight redneſs was perceptible in the throat, which ſeemed more like the effect of mercurial irritation, than of her former diſeaſe. On the 2d of January, two drachms more of the powder were uſed. On the 4th, her mouth was leſs ſore; and Mr. Blicke having examined her, conſidered her complaint as perfectly cured. To make more ſure, however, I directed that ſhe ſhould be fumigated with two drachms that day, and the ſame to be repeated on the 6th; after which ſhe was diſcharged from the hoſpital, and promiſed to come back if ſhe found any return of the diſorder.

" The other caſes in which this method was tried, were ſo ſimilar in their circumſtances and events, as to render a particular recital of them unneceſſary. In every one, a conſiderable affection of the conſtitution was excited in the ſpace of three or four days.

It is to be preſumed, that theſe patients had no particular idioſyncraſy in reſpect to the operation of quickſilver. Thoſe who are affected by that medicine ſlowly and with difficulty, might perhaps have withſtood its action for a longer time.

"It may ſurely be an advantage to be able, in the generality of patients, not merely in venereal, but in other diſeaſes, to produce ſo ſudden and complete a *mercurial* affection of the ſyſtem."

To the objections which have been brought againſt the cure by fumigations, Mr. Abernethy makes this reply. He ſays, "I have heard it objected, that fumigation cannot be depended on for the cure of lues. But I never knew it fail, nor do I ſee why mercury, uſed thus, ſhould, when abſorbed, prove leſs effectual than when this mineral is combined with lard in the common ointment. If fumigations in this mode have failed, it was more probably owing to their being improperly managed, than to any inſufficiency peculiar to them. Thus, if adminiſtered frequently and largely at firſt, they may have conſiderably affected the mouth without proportionally affecting the conſtitution in general; or, from the quickneſs with which they heal venereal ulceration, the cure may have been too ſoon ſuppoſed complete, and their uſe diſcontinued before they had entirely eradicated the diſeaſe. Under proper management, I have no doubt but mercury, employed in this manner, will be found adequate to the cure of every variety of the diſeaſe.

"Beſides their general application, there is another way in which mercurial fumigations may be occaſionally employed with advantage, though the benefit is leſs important; and perhaps this method may be regarded merely as a refinement in the practice of ſurgery. In local diſeaſe of the joints, ſuch, for inſtance, as frequently take place in the knee, and in ſarcomatous enlargements of the breaſt in women, Mr. Sharp and Mr. Blicke have been long accuſtomed to direct fumigated ſtockings, or under-waiſtcoats, to be worn; when the complaints have been relieved, and the conſtitutions of the patients affected, without the trouble and unpleaſantneſs ariſing from the uſe of the common mercurial ointment.

But a French writer, ſuppoſed to be Dr. Petit, in a ſmall book, entitled, *A Parallel of the different Methods of treating the Venereal Diſeaſe*, inſiſts, that there is neither certainty nor ſafety in any other method than the repeated frictions with mercurial ointment, and his opinion is very much countenanced.

If, therefore, it is determined to have recourſe to *mercurial frictions*, the patient may with advantage be prepared by going into the warm bath ſome days ſucceſſively; having been previouſly blooded if of a plethoric habit, and taking a doſe or two of ſome proper cathartic.

The patient being fitted with the neceſſary apparatus of flannels, is then to enter on the courſe, which may be carried on very well with the *ung. hydrarg.* of the London Pharmacopœia, or with the following, directed by Dr. Fordyce:

(No. 128.) ℞ Terebinth. venet. ℥ij.
Hydrargyri ℥j.
Terantur ſimul, quamdiu guttula vel minima appareat, dein adde, Unguent. ſimp. ʒxiv. Miſce fiat unguentum.

Turpentine is here preſcribed, becauſe we are more certain of extinguiſhing the mercury with it, than with any other ſubſtance (excepting balſam of ſulphur, which is fœtid), although it is ſometimes apt to produce little pimples on the ſkin, which are, however, of no material conſequence.

From one drachm to three of this ointment is to be rubbed thoroughly into the thighs, arms, or legs, every other night, beginning, if a ſalivation is not intended, with ʒiſs the firſt time; and, if the mouth is not at all affected, increaſing it to ʒj. ℈ij. the ſecond; and gradually afterwards by gr. x. at a time, as long as the mouth will bear it. If it be intended, we begin with ʒij. every other night, and increaſe or diminiſh the doſe, ſo that the patient ſhall ſpit from ℔ij. to ℔iv. every twenty-four hours.

The ſymptoms of approaching ſalivation are, a diſagreeable taſte in the mouth, and ſoreneſs of the gums or ſalivary glands.

It is ſeldom or never neceſſary to ſalivate a patient, unleſs he be ſo irritable, that the ſmalleſt doſe of mercury immediately affects his mouth; or unleſs the diſeaſe be proceeding ſo faſt, that it would be hazardous to wait till it was checked, by the remedy given in ſuch a manner as to avoid ſalivation; or excepting when we cannot truſt to his uſing it regularly. On the contrary, ſalivation rather renders the effect of the medicine uncertain.

The precautions neceſſary to avoid ſalivation, are, Firſt, exhibiting the mercury as has juſt been deſcribed; Secondly, taking care not to ſtimulate the ſalivary glands, either by rubbing the ſkin over them, and keeping it too warm with flannel, or by any ſtimulus in the mouth; Thirdly, avoiding ſudden expoſure to cold. It is to be obſerved, that the patient is rendered irritable by the uſe of the mercury. Hence cold applied in the circumſtances in which it is apt to produce diſeaſes (as in the *Catarrh)* brings on ſalivation, dyſentery, or rheumatiſm; and the *ſtimulus* of the mercury being directed to the ſalivary glands, or inteſtines, produces in them greater inflammation than that which takes place in a ſalivation from mercury alone, or in a dyſentery from cold alone. It is by no means neceſſary, however, to confine him to a cloſe warm room, except in a ſalivation; it is ſufficient if he wear flannel or cotton next his ſkin, and carefully avoid a moiſt atmoſphere, or rain, and the evening air: on the contrary, the air of a cloſe room often, nay, ſometimes that of a large town, prevents the healing of venereal ulcers, or even the deſtruction of the infectious matter by the mercury, and the patient cannot be cured unleſs he be removed into a freer air, or into the country.

If, notwithſtanding theſe precautions, a ſalivation ſhould come on, we know of no remedy which will remove it with any degree of certainty, although ſulphur, camphire, and purgatives, have been recommended for this purpoſe. If, therefore, the caſe be urgent, the beſt way is to let it go on, uſing the mercurial ointment with great circumſpection; and we ſhould confine the patient to a room where there are no ſtreams of air, but which, at the ſame ime, is not too warm: he ſhould be clothed with flannel, and no food ought to be given him but what is of eaſy digeſtion and good nouriſhment. If the ſymptoms are increaſing ſlowly, the mercury ſhould be omitted till the ſalivation goes off, and afterwards recurred to.

The mercury, whether we ſalivate or not, ſhould be continued four or five weeks, even if the ſymptoms ſhould leave the patient before that thime.

It ſhould be continued till all the ſymptoms are gone off; except, Firſt, when a *gonorrhœa* remains with little inflammation: Secondly, when the patient is much reduced by it, and there are ulcers which do not put on the appearance of healing; in this caſe, it is to be left off, and the patient ſtrengthened, and the common means of curing ulcers not venereal are to be employed; if theſe do not ſucceed, he is to return to the uſe of the mercury: Thirdly, when ulcers covered with fœtid ſloughs appear, and ſpread exceedingly faſt; in this caſe, bark, and the other remedies for gangrene and mortification, are to be made uſe of: Fourthly, when only rheumatic pains remain; theſe, often ariſing from the mercury itſelf, are to be cured by preparations of antimony and ſarſaparilla.

If, by the imprudent uſe of mercury, or expoſure to cold, a ſalivation, with great inflammation of the ſalivary glands and mouth, is brought on, it is to be omitted, and the common antiphlogiſtic remedies uſed, till theſe ſymptoms are carried off. If dyſentery ſhould be brought on, we are to take away from ℥xij to ℥xvj. of blood, and afterwards to give a doſe of rhubarb; laſtly, to ſtop the purging by uſing opium, leaving off the mercury for a day or two.

If rheumatiſm is produced, it is to be treated in the manner directed in that diſeaſe under MEDICINE.

If the mercury ſhould occaſion general inflammation, to a degree which may be dangerous, from ℥xij. to ℥xvj. of blood are to be taken away.

If there be venereal ulcers of any kind, bark may be given with advantage along with the mercury, to the quantity of ℥ß every twenty-four hours; but we are to bleed firſt, if the patient be of an inflammatory habit, or plethoric. The ſame medicine may alſo be uſed in all caſes where the patient's ſtrength is in danger of being too much reduced by the mercury.

If there be eruptions, or pains in the bones, decoctions of woods containing reſinous ſubſtances, and antimonial relaxants, are of conſiderable uſe.

(No. 129.) ℞ Raſur. lig. guaiac. ℥iij.
Coque in aq. font. ℔iv. ad ij.
Colaturæ adde, antim. tart. gr. ⅔ ad gr. iſs. Divide in partes iij. capt. unam mane, alteram poſt pranſum, tertiam H. S. quotidie.

Guaiacum, ſarſaparilla, and ſome other remedies, have ſometimes cured the diſeaſe without mercury, particularly in warm climates; but they are never to be truſted alone. The following are directed by the London College:

(No. 130.) ℞ Radicis ſarſaparillæ inciſæ ℥vj.
Aquæ diſtillatæ lib. viij.

Theſe are ordered to be macerated in a heat of 195 degrees, for two hours; after which the ſarſaparilla is to be taken out and bruiſed, and then mixed again with the decoction and macerated two hours longer. It is then to be reduced, by boiling, to two quarts, and ſtrained.

(No. 131.) ℞ Radicis ſarſaparillæ inciſæ et contuſæ ℥vi.
Corticis radicis ſaſſafras
Ligni guaiaci raſi
Radicis glycyrrhizæ contuſæ ſing. ℥j.
Corticis radicis mezerei ʒiij.
Aquæ diſtillatæ lib. x.

Theſe are to be macerated over a ſlow fire for ſix hours, and the liquor afterwards reduced, by boiling, to five pints. During the latter part of the proceſs, the mezereon is to be added, and the decoction, after a ſhort time, ſtrained.

If the patient be not ſalivated by the mercury, he may uſe ſuch animal food as is of eaſy digeſtion; but he is to avoid ſalt, ſpices, and wine.

If recent chancres be the ſymptoms of the *lues venerea*, they may often be cured by cutting off the ſurface, or deſtroying it by cauſtics; but the mercury ſhould, nevertheleſs, be continued for a month. The ſame external applications are to be uſed to venereal ulcers, as to others of difficult cure.

A *bubo*, if it be juſt beginning, may ſometimes be prevented from ſuppurating: Firſt, by bleeding, when the habit is plethoric or inflammatory. Secondly, by immediately rubbing as much mercurial ointment on the patient's thighs as he can bear without ſalivation. Thirdly, by the application of poultices and fomentations (ſee BUBO). Fourthly, by the application of mercurial plaſters. Fifthly, by *ceruſſa acetata*, according to ſome; but any ſalt of lead, when it lies long upon a part, is hazardous.

If a *bubo* does not ſuppurate, and be not totally diſperſed, ſome of the venereal matter may remain in the gland, till ſome *ſtimulus* occaſion its abſorption, when the diſeaſe may be propagated over the whole ſyſtem. This happens, however, very rarely, and the matter may remain in the part for years together before it makes its appearance.

Where, after a long trial of mercury, diſtreſſing ſymptoms ſtill remain, particularly obſtinate ulcerations, and ſevere pains, benefit has often been derived from the uſe of opium: but there is little reaſon to believe, as has been held by ſome, that of itſelf it affords an infallible cure of this diſeaſe; at leaſt we are inclined to think, that all the facts hitherto brought in ſupport of the cure of ſyphilis by opium alone, are, at the utmoſt, very doubtful, if not decidedly erroneous.

In obſtinate ulcerations, remaining probably after the venereal virus has been overcome, and reſiſting the uſe of mercury, a complete cure has, in many inſtances, been obtained from the uſe of the root of the mezereon, the “ daphne mezereon” of Linnæus. This article has been chiefly employed in the hoſpitals under the form of decoction:

(No. 132.) ℞ Cort. rad. mezerei ʒij.
Aq. fontanæ ℔iij.
Coque ad colat. ℔ij. quotidie ſumend.

Another highly celebrated remedy in venereal complaints, is known under the title of *Liſbon diet-drink*, of which one or other of the two following is ſuppoſed to be the receipt:

(No. 133.) ℞ Sarſaparillæ inciſæ
Ligni ſantali rubri
Ligni ſantali citrini ſing. ℥iſs.
Radicis glycyrrhizæ
Radicis mezerei ſing. ʒij.
Ligni rhodii
Ligni guaiaci officinalis
Ligni ſaſſafras ſing. ʒſs.
Antimonii unc. j.
Aquæ diſtillatæ lib. v.

Theſe ingredients are to be macerated for twenty-four hours, and afterwards boiled till the fluid is reduced to half its original quantity. From one to four pints are given daily.

(No. 134.) ℞ Sarſaparillæ inciſæ
Radicis chinæ ſing. ℥j.
Nucum juglandis cortice ſiccatarum No. xx.
Antimonii ℥ij.
Lapidis pumicis pulveriſati ℥j.
Aquæ diſtillatæ lib. x.

The powdered antimony and pumice ſtone are to be tied in ſeparate pieces of rag, and boiled along with the other ingredients.

The following are ſaid alſo to poſſeſs ſpecific powers in ſyphilis, but they are not yet eſtabliſhed by ſufficient experience:

(No. 135.) ℞ Lobeliæ ſyphilitic. p. j. coque in aq. font. cong. iſs.
Of this the patient is to begin with a quart a-day, gradually increaſing it, till he cannot bear the purging it cauſes; he is then to diſcontinue it for a few days, and if any ſymptoms remain, he is to begin with it again, and to continue it till he finds himſelf well.

(No. 136.) ℞ Extract. gratiolæ dur. ʒj.
Sacch. alb.
Chel. cancr. ppt. aa ʒiiſs.
M. capt. gr. x. ter in die. Doſis ſenſim augenda eſt, donec ʒj. in die ſumatur.

Vel, (No. 137.) ℞ Aſtragali exſcapi ℥iſs.
Coque in Aq. fontan. ℔iſs. ad colat. ℔j.
Mane et veſperi quotidie tepidam ſumendam.

Upon the whole, however, the ſequelæ of this diſeaſe, perhaps, more immediately require country air, gentle exerciſe, and nouriſhing diet, particularly a milk diet, than the uſe of medicine. For combating different anomalous appearances, various practices, accommodated to the nature of them, will, on particular occaſions, be requiſite; and theſe may be fully known by conſulting the late Mr. Hunter's excellent treatiſe on the venereal diſeaſe.

CHAP. XXX. On IMPOTENCE.

There are many cauſes of *impotence*; as, a natural defect in the organs of generation, which ſeldom admits of a cure; accidents or diſeaſes, in which caſes the impotence may or may not be remedied, according as theſe are curable or otherwiſe; but the common cauſes, and almoſt the only, are early and immoderate venery, or the practice of maſturbation in youth. We have a few inſtances, indeed, of unfitneſs for generation in men, owing to an impediment to the ejection of the ſemen in coition, from a wrong direction which the orifice at the *verumontanum* has got, whereby the ſeed was thrown up into the bladder. M. Petit cured one patient under ſuch a difficulty of emiſſion, by making an inciſion like to that commonly made in the great operation for the ſtone.

On this ſubject, the moſt important and curious obſervations are thoſe of the late Mr. John Hunter, who conſiders impotency as depending upon two cauſes. One he refers to the mind; the other to the organs of generation. He introduces his remarks by obſerving, that nothing hurts the mind of a man ſo much as the idea of inability to perform well the duty of the ſex. "If his ſcrotum hangs low it makes him miſerable; he conceives immediately that he is to be rendered incapable of performing thoſe acts in which he prides himſelf moſt. It is certain that the relaxation, or contraction of the ſcrotum, is in ſome degree a kind of ſign of the conſtitution; but it is of the conſtitution at large, not of thoſe parts in particular. Nurſes are ſo ſenſible of the contraction of that part being a ſign of health in the children under their care, that they take notice of it. The relaxation of it in them cannot be ſuppoſed to ariſe from inability to perform thoſe acts at one time more than another. The face is one of the ſigns of the conſtitution, and has as much to do with thoſe peculiar acts as the ſcrotum. However, we muſt allow that this part is much more lax than what we ſhould conceive was intended by nature, even in young men who are well in health; but as this is very general, I rather ſuſpect that it ariſes from the circumſtances of the part being kept too warm, and always ſuſpended, the muſcles hardly ever being allowed to act, ſo that they have leſs force. How far it is the ſame in thoſe countries whoſe dreſs does not immediately ſuſpend thoſe parts, I have not been able to aſcertain. Warmth appears to be one cauſe, for we find that cold has always an immediate effect; but this is perhaps owing to its not being accuſtomed to cold, which if it were, it might poſſibly become as regardleſs of it as it was of warmth. What the difference is in this part, in a cold and warm climate, all other circumſtances the ſame, I do not know. But whatever may be the cauſe, if it is really in common more lax than intended by nature, it is of no conſequence as to the powers of generation. The teſticles will ſecrete whether kept high or low."

SECT. I. *Of* IMPOTENCE, *as depending upon the* MIND.

On this part of the ſubject, he obſerves, that as the "parts of generation are not neceſſary for the exiſtence or ſupport of the individual, but have a reference to ſomething elſe in which the mind has a principal concern; ſo a complete action in thoſe parts cannot take place without a perfect harmony of body and of mind: that is, there muſt be both a power of body, and diſpoſition of mind; for the mind is ſubject to a thouſand caprices, which affect the actions of theſe parts.

"Copulation is an act of the body, the ſpring of which is in the mind; but it is not volition: and according to the ſtate of the mind ſo is the act performed. To perform this act well, the body ſhould be in health, and the mind ſhould be perfectly confident of the powers of the body: the mind ſhould be in a ſtate entirely diſengaged from every thing elſe; it ſhould have no difficulties, no fears, no apprehenſions, not even an anxiety to perform the act well; for even this anxiety is a ſtate of mind different from what ſhould prevail: there ſhould not be even a fear that the mind itſelf may find a difficulty at the time the act ſhould be performed. Perhaps no function of the machine depends ſo much upon the ſtate of the mind as this.

"The will and reaſoning faculty have nothing to do with this power; they are only employed in the act, ſo far as voluntary parts are made uſe of: and if they ever interfere, which they ſometimes do, it often produces another ſtate of mind which deſtroys that which is proper for the performance of the act; it produces a deſire, a ſort of wiſh, a hope, which are all only diffidence and uncertainty, and create in the mind the idea of a poſſibility of the want of ſucceſs, which deſtroys the proper ſtate of mind, or neceſſary confidence.

"There is, perhaps, no act in which a man feels himſelf more intereſted, or is more anxious to perform well; his pride being engaged in ſome degree, which, if within certain bounds, would produce a degree of perfection in an act depending upon the will, or an act in voluntary parts; but when it produces a ſtate of mind contrary to that ſtate on which the perfection of the act depends, a failure muſt be the conſequence.

"The body is not only rendered incapable of performing this act by the mind being under the above influence, but alſo by the mind being, though perfectly confident of its power, yet conſcious of an impropriety in performing it: this, in many caſes, produces a ſtate of mind which ſhall take away all power. The ſtate of a man's mind reſpecting his ſiſter, takes away all power. A conſcientious man has been known to loſe his powers, on finding the woman he was going to be connected with unexpectedly a virgin.

"Shedding tears ariſes entirely from the ſtate of the mind, although not ſo much a compound action as the act in queſtion; for none are ſo weak in body that they cannot ſhed tears: it is not ſo much a compound action of the mind and ſtrength of body joined, as the other act is; yet if we are afraid of ſhedding tears, or are deſirous of doing it, and that anxiety is kept up through the whole of an affecting ſcene, we certainly ſhall not ſhed tears, or at leaſt not ſo freely as would have happened from our natural feelings.

"From this account of the neceſſity of having the mind independent reſpecting the act, we muſt ſee that it may very often happen that the ſtate of mind will be ſuch as not to allow the animal to exert its natural powers; and every failure increaſes the evil. We muſt alſo ſee, from this ſtate of the caſe, that this act muſt be often interrupted; and the true cauſe of this interruption not being known, it will be laid to the charge of the body, or want of powers. As theſe caſes do not ariſe from real inability, they are to be carefully diſtinguiſhed from ſuch as do; and perhaps the only way to diſtinguiſh them is, to examine into the ſtate of mind reſpecting this act. So trifling, often, is the circumſtance which ſhall produce this inability depending on the mind, that the very deſire to pleaſe ſhall have that effect, as in making the woman the ſole object to be gratified.

"Caſes of this kind we ſee every day; one of which I ſhall relate as an illuſtration of this ſubject, and alſo of the method of cure. A gentleman told me that he had loſt his virility. After above an hour's inveſtigation of the caſe, I made out the following facts: that he had at unneceſſary times ſtrong erections, which ſhewed that he had naturally this power; that the erections were accompanied with deſire, which are all the natural powers wanted; but that there was ſtill a defect ſomewhere, which I ſuppoſed to be from the mind. I enquired if all women were alike to him: his anſwer was, No; ſome women he could have connection with as well as ever. This brought the defect, whatever it was, into a ſmaller compaſs: and it appeared that there was but one woman that produced this inability, and it aroſe from a deſire to perform the act with this woman well; which deſire produced in the mind a doubt or fear of the want of ſucceſs, which was the cauſe of the inability of performing the act. As this aroſe entirely from the ſtate of the mind, produced by a particular circumſtance, the mind was to be applied to for the cure; and I told him that he might be cured, if he could perfectly rely on his own power of ſelf-denial. When I explained what I meant, he told me that he could depend upon every act of his will or reſolution. I then told him, that if he had a perfect confidence in himſelf in that reſpect, he was to go to bed to this woman, but firſt promiſe to himſelf that he would not have any connection with her for ſix nights, let his inclinations and powers be what they would; which he engaged to do, and alſo to let me know the reſult. About a fortnight after, he told me, that his reſolution had produced ſuch a total alteration in the ſtate of his mind, that the power ſoon took place; for inſtead of going to bed with the fear of inability, he went with fears that he ſhould be poſſeſſed with too much deſire, too much power, ſo as to become uneaſy to him: which really happened; for he would have been happy to have ſhortened the time; and when he had once broke the ſpell, the mind and powers went on together, and his mind never returned to its former ſtate."

SECT. II. *Of* IMPOTENCE *from want of* PROPER CORRESPONDENCE *between the* ACTIONS *of the* DIFFERENT ORGANS.

Mr. HUNTER, in a former part of his Treatiſe, when conſidering the diſeaſes of the urethra and bladder, had remarked, that every organ in an animal body, without exception, was made up of different parts, whoſe functions or actions were totally different from one another, although all tending to produce one ultimate effect: In all ſuch organs, when perfect (he obſerves), there is a ſucceſſion of motions, one naturally ariſing out of the other, which, in the end, produces the ultimate effect; and an irregularity alone in theſe actions will conſtitute diſeaſe, at leaſt will produce very diſagreeable effects, and often totally fruſtrate the intention of the organ. This principle Mr. Hunter, on the preſent occaſion, applies to the "actions of the teſticles and penis: for we find, that an irregularity of the actions of theſe parts ſometimes happens in producing impotence; and ſomething ſimilar, probably, may be one cauſe of barrenneſs in women.

" In men, the parts ſubſervient to generation, may be divided into two: the eſſential, and the acceſſory. The teſticles are the eſſential; the penis, &c. the acceſſory. As this diviſion ariſes from their uſes or actions in health, which exactly correſpond with one another, a want of exactneſs in the correſpondence or ſuſceptibility of thoſe actions may alſo be divided into two: where the actions are reverſed, the acceſſory taking place without the firſt, or eſſential, as in the erections of the penis, where neither the mind nor the teſticles are ſtimulated to action; and the ſecond is where the teſticles perform the action of ſecretion too readily for the penis, which has not a correſponding erection. The firſt is called *priapiſm*; and the ſecond is what ought to be called *ſeminal weakneſs*.

" The mind has conſiderable effect on the correſpondence of the actions of theſe two parts: but it would appear, in many inſtances, that erections of the penis depend more on the ſtate of the mind than the ſecretion of the ſemen does; for many have the ſecretion, but not the erection; but in ſuch, the want of erection appears to be owing to the mind only.

" Priapiſm often ariſes ſpontaneouſly; and often from viſible irritation of the penis, as in the venereal gonorrhœa, eſpecially when violent. The ſenſation of ſuch erections is rather uneaſy than pleaſant; nor is the ſenſation of the glans, at the time, ſimilar to that ariſing from the erections of deſire, but more like to the ſenſation of the parts immediately after coition. Such as ariſe ſpontaneouſly are of more ſerious conſequence than thoſe from inflammation, as they proceed, probably, from cauſes not curable in themſelves, or by any known methods. The priapiſm ariſing from inflammation of the parts, as in a gonorrhœa, is attended with nearly the ſame ſymptoms; but generally the ſenſation is that of pain, proceeding from the inflammation of the parts. It may be obſerved, that what is ſaid of priapiſm is only applicable to it when a diſeaſe in itſelf, and not when a ſymptom of other diſeaſes, which is frequently the caſe.

" The common practice in the cure of this complaint is to order all the nervous and ſtrengthening medicines; ſuch as bark, valerian, muſk, camphor, and alſo the cold bath. I have ſeen good effects from the cold bath; but ſometimes it does not agree with the conſtitution, in which caſe I have found the warm bath of ſervice. Opium appears to be a ſpecific in many caſes; from which circumſtance I ſhould be apt, upon the whole, to try a ſoothing plan.

" Seminal weakneſs, or a ſecretion and emiſſion of the ſemen, without erections, is the reverſe of a priapiſm, and is by much the worſt diſeaſe of the two. There is great variety in the degrees of this diſeaſe, there being all the gradations from the exact correſpondence of the actions of all the parts to the teſticles acting alone; in every caſe of the diſeaſe, there is too quick a ſecretion and evacuation of the ſemen. Like to the priapiſm, it does not ariſe from deſires and abilities; although when mild it is attended with both, but not in a due proportion; a very ſlight deſire often producing the full effect. The ſecretion of the ſemen ſhall be ſo quick, that ſimple thought, or even toying, ſhall make it flow.

"Dreams have produced this evacuation repeatedly in the ſame night; and even when the dreams have been ſo ſlight, that there has been no conſciouſneſs of them when the ſleep has been broken by the act of emiſſion. I have known caſes where the teſticles have been ſo ready to ſecrete, that the leaſt friction on the glans has produced an emiſſion: I have known the ſimple action of walking or riding produce this effect, and that repeatedly, in a very ſhort ſpace of time.

"A young man, about four or five and twenty years of age, not ſo much given to venery as moſt young men, had theſe laſt-mentioned complaints upon him. Three or four times in the night he would emit; and if he walked faſt, or rode on horſeback, the ſame thing would happen. He could ſcarcely have connection with a woman before he emitted, and in the emiſſion there was hardly any ſpaſm. He tried every ſuppoſed ſtrengthening medicine, as alſo the cold bath, and ſea-bathing, but with no effect. By taking twenty drops of laudanum on going to bed, he prevented the night emiſſions; and by taking the ſame quantity in the morning, he could walk or ride without the before-mentioned inconvenience. I directed this practice to be continued for ſome time, although the diſeaſe did not return, that the parts might be accuſtomed to this healthy ſtate of action; and I have reaſon to believe the gentleman is now well. It was found neceſſary, as the conſtitution became more habituated to the opiate, to increaſe the doſe of it.

"The ſpaſms, upon the evacuation of the ſemen in ſuch caſes, are extremely ſlight, and a repetition of them ſoon takes place; the firſt emiſſion not preventing a ſecond; the conſtitution being all the time but little affected *. When the teſticles act alone, without the acceſſory parts taking up the neceſſary and natural conſequent action, it is ſtill a more melancholy diſeaſe; for the ſecretion ariſes from no viſible or ſenſible cauſe, and does not give any viſible or ſenſible effect, but runs off ſimilar to involuntary ſtools or urine.

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* "It is to be conſidered, that the conſtitution is commonly affected by the ſpaſms only, and in proportion to their violence, independent of the ſecretion and evacuation of the ſemen. But in ſome caſes even the erection going off without the ſpaſms or the emiſſion, ſhall produce the ſame debility as if they had taken place."

It has been obſerved that the ſemen is more fluid than natural in ſome of theſe caſes.

"There is great variety in the diſeaſed actions of theſe parts; of which the following caſe may be conſidered as an example:—A gentleman has had a ſtricture in the urethra for many years, for which he has frequently uſed a bougie, but of late has neglected it. He has had no connection with women for a conſiderable time, being afraid of the conſequences. He has often in his ſleep involuntary emiſſions, which generally awake him at the paroxyſm; but what ſurpriſes him moſt is, that often he has ſuch without any ſemen paſſing forwards through the penis, which makes him think that at thoſe times it goes backwards into the bladder. This is not always the caſe, for at other times the ſemen paſſes forwards. At the time the ſemen ſeems to paſs into the bladder, he has the erection, the dream; and is awaked with the ſame mode of action, the ſame ſenſation, and the ſame pleaſure, as when it paſſes through the urethra, whether dreaming or waking. My opinion is, that the ſame irritation takes place in the bulb of the urethra without the ſemen, that takes place there when the ſemen enters, in conſequence of all the natural preparatory ſteps, whereby the very ſame actions are excited as if it came into the paſſage: from which one would ſuppoſe, that either the ſemen is not ſecreted, or, if it be, that a retrograde motion takes place in the actions of the acceleratores urinæ. But if the firſt be the caſe, then we may ſuppoſe, that in the natural ſtate the actions of thoſe muſcles do not ariſe ſimply from the ſtimulus of the ſemen in the part, but from their action being a termination of a preceding one, making part of a ſeries of actions. Thus they may depend upon the friction, or the imagination of a friction, on the penis; the teſticles not doing their part, and the ſpaſm in ſuch caſes ariſing from the friction, and not from the ſecretion. In many of thoſe caſes of irregularity, when the erection is not ſtrong, it will go off without the emiſſion; and at other times an emiſſion ſhall happen almoſt without an erection; but theſe ariſe not from debility, but affections of the mind.

"In many of the preceding caſes, waſhing the penis, ſcrotum, and perinæum, with cold water, is often of ſervice; and to render it colder than we find in ſome ſeaſons of the year, common ſalt may be added to it, and the parts waſhed when the ſalt is almoſt diſſolved."

SECT. III. *Of the* GENERAL EFFECTS *of* ONANISM, *and its Diſpoſition to occaſion* IMPOTENCE.

Dr. Tiſſot has publiſhed a treatiſe on the pernicious effects of this ſhameful and often fatal practice, which appears to be no leſs baneful to the mind than to the body. He begins with obſerving, that by the continual waſte of the human body, aliments are required for our ſupport. Theſe aliments, however, require certain preparations in the body itſelf; and when by any means we become ſo altered that theſe preparations cannot be effected, the beſt aliments then prove inſufficient for the ſupport of the body. Of all the cauſes by which this morbid alteration is brought on, none is more common than too copious evacuations; and of all evacuations, that of the ſemen is the moſt pernicious when carried to exceſs. It is alſo to be obſerved, that though exceſs in natural venery is productive of very dangerous diſorders, yet an unequal evacuation by ſelf-pollution, which is an unnatural way, is productive of others ſtill more to be dreaded.* The conſequences enumerated by Tiſſot are as follow:

1. All the intellectual faculties are weakened; the memory fails; the ideas are confuſed, and the patient ſometimes even falls into a ſlight degree of inſanity. They are continually under a kind of inward reſtleſſneſs, and feel a conſtant anguiſh. They are ſubject to giddineſs; all the ſenſes, eſpecially thoſe of ſeeing and hearing, grow weaker and weaker, and they are ſubject to frightful dreams.

2. The ſtrength entirely fails, and the growth in young perſons is conſiderably checked. Some are afflicted with almoſt continual watching, and others doſe almoſt perpetually. Almoſt all of them become hypochondriac or hyſteric, and are afflicted with all the evils which attend theſe diſorders. Some have been known to ſpit calcareous matter; and others are afflicted with coughs, ſlow fevers, and conſumptions.

3. The patients are affected with the moſt acute pains in different parts of the body, as the head, breaſt, ſtomach, and inteſtines; while ſome complain of an obtuſe ſenſation of pain all over the body, on the ſlighteſt impreſſion.

4. There are not only to be ſeen pimples on the face, which are one of the moſt common ſymptoms; but even blotches, or ſuppurative puſtules, appear on the face, noſe, breaſt, and thighs; and ſometimes fleſhy excreſcences ariſe on the forehead.

5. The organs of generation are alſo affected; and the ſemen is evacuated on the ſlighteſt irritation, even that of going to ſtool. Numbers are afflicted with an habitual gonorrhœa, which entirely deſtroys the vigour of the conſtitution, and the matter of it reſembles a fetid ſanies. Others are affected with painful priapiſms, dyſuries, ſtranguries, and heat of urine, with painful tumors in the teſticles, penis, bladder, and ſpermatic cord.

6. The functions of the inteſtines are ſometimes totally deſtroyed; and ſome patients complain of coſtiveneſs, others of diarrhœa, piles, and the running of a fœtid matter from the fundament.

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* Tiſſot calculates on the debilitating effects of onaniſm, by ſtating, that the emiſſion of *half an ounce of ſemen* is equal to the loſs of *forty ounces* of blood.

Concerning the general facts reſpecting the production of *venereal impotence* by the continued practice of this beaſtly gratification, Mr. Hunter entertains ſome opinions peculiar to himſelf, and he treats the ſubject, in this view of its application, in a manner conformable to the theory he adopts with regard to the act of coition. In page 200 of his treatiſe on the venereal diſeaſe are the following remarks. Speaking of *Impotence*, he ſays, "This complaint is by many laid to the charge of onaniſm at an early age; but how far this is juſt, it will in many caſes be difficult to determine; for upon a ſtrict review of this ſubject, it appears to me to be by far too rare to originate from a practice ſo general.

"How far the attributing to this practice ſuch a conſequence, is of public utility, I am doubtful, particularly as it is followed moſt commonly at an age when conſequences are not ſufficiently attended to, even in things leſs gratifying to the ſenſes; but this I can ſay with certainty, that many of thoſe who are affected with the complaints in general are miſerable from this idea; and it is ſome conſolation for them to know that it is poſſible it may ariſe from other cauſes. I am clear in my own mind that the books on this ſubject have done more harm than good. I think I may affirm that this act in itſelf does leſs harm to the conſtitution in general than the natural. That the natural with common women, or ſuch as we are indifferent about, does leſs harm to the conſtitution than where it is not ſo ſelfiſh, and where the affections for the woman are alſo concerned. Where it is only a conſtitutional act it is ſimple, and only one action takes place; but where the mind becomes intereſted, it is worked up to a degree of enthuſiaſm, increaſing the ſenſibility of the body and diſpoſition for action; and when the complete action takes place, it is with proportional violence; and in proportion to the violence is the degree of debility produced, or injury done to the conſtitution.

"In the caſes of this kind that have come under my care, although the perſons themſelves have been very ready to ſuppoſe that the diſeaſe aroſe from the cauſe here alluded to; yet they did not appear to have given more into the practice than common; and in particular, the worſt caſe I have ever ſeen was where but very little of this practice had ever been uſed, much leſs than in common among boys or lads. The only true objection to this ſelfiſh enjoyment is the probability of its being repeated too frequently."*

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* Many perſons, improperly confounding the philoſophical inveſtigator of facts with the moraliſt, whoſe offices are perfectly diſtinct in themſelves, have objected to the moral tendency of ſome of Mr. Hunter's reflections on this ſubject. It is evident, that however the practice in queſtion is to be reprobated by every good man, and diſcouraged by every medical caution which has *truth* for its baſis, profeſſional men addreſſing each other, need labour under no ſuch reſtraint, nor is it for the intereſt of mankind, whoſe benefit is conſulted in their labours, that it ſhould.

With regard to the *cure of the diſeaſes produced by onaniſm*, Tiſſot ſays, the firſt ſtep is to leave off thoſe practices which have occaſioned the diſeaſe. This the author aſſerts is no eaſy matter; as, according to him, the ſoul itſelf becomes polluted, and can dwell on no other idea; or if ſhe does, the irritability of the parts of generation themſelves quickly recal ideas of the ſame kind. This irritability is, no doubt, much more to be dreaded than any pollution the ſoul can have received; and by removing it, there will be no occaſion for exhortations to diſcontinue the practice. The principal means for diminiſhing this irritability are, in the firſt place, to avoid all ſtimulating, acrid, and ſpiced meats. A low diet, however, is improper, becauſe it would further reduce the body, already too much emaciated. The food ſhould, therefore, be nutritive, but plain, and ſhould conſiſt of fleſh rather roaſted than boiled, rich broths, &c. It is certain, however, that as theſe foods contribute to reſtore the ſtrength of the body, the ſtimulus on the organs of generation will be proportionably increaſed, by the ſemen which is conſtantly ſecreted, and which will now be in larger quantity than even in healthy perſons, owing to the great evacuations of it which have preceded. Some part of the ſemen is gradually abſorbed by the lymphatics; in conſequence of which, the remainder becomes thick, acrid, and very ſtimulating. To remedy this, exerciſe is to be uſed, and that not only for pleaſure, but till it is attended with a very conſiderable degree of fatigue. The ſleep alſo muſt be no more than is barely ſufficient to repair the fatigues occaſioned by the exerciſe, or other employment; for an exceſs in ſleep is as bad as idleneſs, or ſtimulating foods. Exceſs in wine or intoxicating liquors, is alſo to be avoided; or rather ſuch liquors ought never to be taſted, unleſs as medicine to reſtore the exhauſted ſpirits: and to all this ought to be joined the Peruvian bark, which hath this admirable property, that, with little or no ſtimulus, it reſtores the tone of the ſyſtem, and invigorates the body in a manner incredible to thoſe who have not obſerved its effects. If theſe directions are followed, the patient may almoſt certainly expect a recovery, provided any degree of vital ſtrength remains; and thoſe who deſire a life of celibacy on a moral account, will find them much more effectual than all the vows of chaſtity they can make.

On the *treatment of impotence not occaſioned by onaniſm*, we ſhall be very conciſe. In caſes where there has been a manifeſt want of power in the genitals, the peculiar action of cantharides on theſe parts has been uſefully ſuperinduced; but their exhibition is by no means accompanied with durable good effects; and their action, as provocatives to venery, has often led to injurious conſequences. At any rate, when the uſe of this remedy is determined on, it ſhould be employed with caution, in moderate doſes, and joined with opium, bark, or camphor. In the Pharmacopœia Chirurgica, we have the following formula:

(No. 138.) ℞ Cantharid. in pulv. trit. gr. xviij.
Opii purificat.
Camphoræ ſing. gr. xxxvj.
Conſ. cynoſbat. q. ſ.
Fiant pilulæ xxxvj. Detur j. omni nocte.

Dr. Temple ſays, the patient muſt cautiouſly abſtain from thoſe remote cauſes of the diſeaſe which depend upon his will. The parts muſt be invigorated by topical bathing, and bliſters to the perinæum; and the general ſyſtem by bathing and tonics, and nouriſhing food of eaſy digeſtion. He ſhould riſe early, and not indulge in bed in a morning; and, where emiſſions happen during ſleep, he ſhould ſecure the penis by ligature, ſo that an erection cannot take place, without his being awaked at the beginning of it. The following medicines may eventually be ſerviceable in ſtrengthening the debilitated organs:

(No. 139.) ℞ Gum. oliban.
Pulv. cinchonæ
Pulv. rhab. aa ʒj.
Balſ. canadens. q. ſ.
M. fiat pill. xxxvj. quarum capiat iv. bis in die cum hauſt. ſequent.

(No. 140.) ℞ Decoct. cort. ſimaroub. ℥ij.
Acid. vitriol. dilut. gtt. xv. M. f. hauſtus.

Notwithſtanding what has been ſaid, it cannot but be obvious that the treatment of the diſeaſes of thoſe organs of the body which are deſigned for ſo curious a purpoſe as that of propagating the ſpecies, and which are ſo eſſentially under the *influence of the mind*, is extremely nice and difficult, and ſcarcely ſuſceptible of that degree of preciſion which will juſtify our noticing the ſubject at any greater length.

CHAP. XXXI. ON THE DISEASES OF THE PENIS.

Amongſt the diſeaſes affecting this part of the human body, the *Gonorrhœa* might naturally have been conſidered; but we rather preferred treating that ſubject in conjunction with one not neceſſarily *local*, in a preceding chapter, under the character of venereal diſeaſes. We now proceed to ſpeak of diſeaſes more immediately to be conſidered thoſe of the penis.

SECT. I. *Of* PHYMOSIS *and* PARAPHYMOSIS.

In PHYMOSIS the prepuce is thickened, and contracted before the glans, ſo that it cannot be readily drawn behind it. In ſome people there is a conſtitutional phymoſis from the natural ſtraitneſs of the prepuce. Sometimes it ariſes from the matter ſecreted by the odoriferous glands at the root of the glans becoming acrid; ſometimes from an anaſarcous ſwelling of the ſcrotum and penis; but moſt frequently from venereal virus.

The cure muſt depend upon the nature of the cauſe producing the diſeaſe. If the ſymptoms be inflammatory and of no long continuance, fomenting the parts frequently with warm emollient decoctions, or bathing them in warm milk, and then applying emollient poultices, or keeping the diſeaſed parts conſtantly moiſt with a cold aſtringent ſolution, and turning the penis upwards and ſupporting it againſt the belly, commonly give relief. If the inflammation has ariſen from a venereal cauſe, part of the fluid ought frequently to be injected, by means of a ſyringe, between the prepuce and glans, ſo as to waſh off any matter which may there be concealed; but if the inflammation ſtill continues to increaſe, blood-letting is neceſſary, both general and local. The veins of the penis are ſometimes adviſed to be opened with a lancet; but this is unſafe on account of the nerves. Leeches may be applied; but care muſt be taken, in venereal caſes, leſt the bites of theſe animals, by abſorbing venereal matter, turn into chancres. Along with the remedies already adviſed, gentle laxatives, low diet, and abſtinence, ought to be preſcribed. But if, after a due perſeverance in theſe means, it is found that they have had little effect in removing the diſorder, or perhaps that the ſymptoms are conſtantly increaſing, and that chancres are confined under the prepuce; in that caſe it is neceſſary to *ſlit open the prepuce*, which is beſt done by a ſharp-pointed biſtoury, concealed in a grooved directory, fig. 78. This is to be introduced between the prepuce and glans till the director is found by the finger to have reached the upper or back part of the prepuce. The operator is now to keep the director firm with one hand, while with the other he puſhes forward the knife, till its point paſſes through the prepuce; then drawing the inſtrument towards him, he cuts the prepuce through its whole length.

The operation being performed, the parts are to be waſhed and cleaned with warm water, and the ſore dreſſed with a little ſoft lint, and a compreſs of linen laid over it. The whole may be retained by a ſmall bag properly adapted, and ſecured by two ſtraps to a bandage put round the body. This bag may be left open at the under end, to allow the patient to make water, without removing the dreſſings; but if this be found impracticable, the dreſſings may be removed with little inconvenience. If the glans be much inflamed and excoriated, care ſhould be taken to inſert lint ſpread with emollient ointment between the glans and prepuce, otherwiſe troubleſome adheſions are apt to enſue. It is evident, that when this diſeaſe is of the venereal kind, the ſore will not readily heal till the poiſon be eradicated from the conſtitution.

In ſome caſes of phymoſis the preputium is ſo remarkably long, and the contraction ſo much confined to the point, that a circular inciſion is preferable to a longitudinal one; and it is eaſily effected, by ſeparating ſuch a portion as may be found neceſſary of the whole circumference of the prepuce. The dreſſings in this caſe are the ſame as when the prepuce is ſlit open.

Paraphymosis is the reverſe of phymoſis, being formed by a retraction of the prepuce, producing ſtricture behind the glans of the penis. Like the former diſeaſe, it ariſes moſt frequently from a venereal infection, but may be produced from whatever preternaturally enlarges the glans or conſtricts the prepuce.

In the incipient ſtate, the patient may generally be relieved by the ſurgeon puſhing the glans gently back with his thumbs, while with his fingers he brings the prepuce gradually forward. But a more effectual method than this is to encloſe the glans with one of the hands, and preſs gently on all ſides, by which the fluids forming the enlargement will be puſhed into the body of the penis behind the ſtricture. If this method be perſevered in for a conſiderable time, it will generally be found to anſwer the purpoſe; but ſhould it prove ineffectual, we may try the effects of cold applications; and the beſt ſeem to be thoſe of the aſtringent kind. When the penis is evidently much ſwelled and inflamed, the patient ſhould be kept cool, gentle laxatives and low diet ſhould be preſcribed, and a number of leeches applied to the penis. Should the diſeaſe ſtill continue to increaſe, and an œdematous ſwelling appear about the under part of the prepuce, an operation is neceſſary to prevent a mortification from taking place in the glans. An inciſion is to be made on each ſide of the penis immediately behind the glans, ſo large as completely to divide the ſtricture. The wound ought to be allowed to bleed freely; after which a pledget ſpread with ſimple ointment is to be applied, and an emollient poultice laid over the whole.

Sect. II. *Of an* Incomplete Urethra.

In children, eſpecially males, the urethra is ſometimes incomplete, ending before it reaches the uſual place of termination. Sometimes it does ſo without any external opening, at other times it opens at a diſtance from the common termination. In the firſt caſe, a ſmall trocar is to be introduced in the direction the urethra ought to take, till the urine be diſcharged; after which, the paſſage is to be kept open by the uſe of bougies, till the ſides be rendered callous and an opening preſerved. In the other caſe, as the opening which is already found affords a temporary paſſage for the urine, it will be better to delay doing any operation till the patient be further advanced in life, when it is to be performed as in the former caſe.

After the operation, a piece of flexible catheter may be introduced, as well for the purpoſe of rendering the paſſage free and callous, as for carrying off the water till a cure is made.

SECT. III. *Of* RUPTURE *of the* URETHRA.

This, though an unuſual, is nevertheleſs a poſſible accident, and one with which the ſurgeon ſhould not be unacquainted. The following curious account of a rupture of the urethra, and of a ſolution of a catgut bougie in the bladder, given by Dr. Darwin, of Shrewſbury, in vol. iii. of the Memoirs of the Medical Society of London, will afford all the information we can ſupply on the ſubject:

"Many caſes," ſays the doctor, "have been related to me of a diſeaſe ſuppoſed to have been a *catarrh of the bladder*, or a ſuppuration of the proſtate gland. In one, the patient died tabid from the purulent abſorption; in another, from a ſudden eryſipelas and mortification of the ſcrotum and parts in vicinity; and in another, the patient was recovered by the uſe, as was ſuppoſed, of a grain of opium taken at firſt twice a-day, but afterwards increaſed. The caſe I am now going to relate, gave me further light into this kind of complaint; and has perſuaded me that it is probable no ſuch diſeaſe as a catarrh of the bladder ever exiſts.

"Mr. ——, about forty years of age, had during many years laboured under a difficulty of making water, inſomuch that for two or three years together he never paſſed his water without previouſly introducing a bougie. About five years ago, he had at intervals a great quantity of a purulent ſediment in his water; generally ſome clear urine came firſt, and then a tea-cupful or more of thick matter, which was ſometimes ſo thick as to have the appearance (as he expreſſed it) of liquid chalk. This matter always came along with his urine, and was attended with conſiderable pain; but ſometimes, for a month or two, the quantity of the diſcharge would be leſs, and again at times much increaſed, along with the difficulty of making water and pain. On drying ſome parcels of this matter on paper, it had a chalky appearance, which induced the patient to ſuſpect it was the gout in the bladder. He had, during three years, occaſionally, cold ſhivering fits, which were termed ague fits; and for which he took Peruvian bark, as he ſuppoſed, with advantage; but was always free from hectic fever: which circumſtance was aſcribed to the heavy diſcharge of the matter.

"During the long continuance of this diſeaſe many things were tried, and he conſulted the moſt eminent ſurgeons in London without information or advantage. A ſtone was ſuſpected, but not diſcovered; as an eminent ſurgeon in London endeavoured, in vain, at this time, to introduce even a bougie paſt the obſtructed part of the urethra, and the proſtate gland was ſaid to be hardened and enlarged. He found ſome relief by uſing a warm fomentation every night for an hour or two, by taking ſmall quantities of opium, and by ſupping upon a pint of milk, flavoured with bitter almond and ſugar, in which was diſſolved half an ounce of iſinglaſs.

"After about five years the diſeaſe manifeſted itſelf by a permanent tumor in the perinæum, which broke externally, and the urine came along with the matter by the orifice. After it thus broke, he could never introduce a bougie beyond the wounded part, ſo that the cure was left to unaſſiſted nature. The urine through the wound leſſened by degrees; and, after ſome months, the hard ſinus which was there formed, gradually diſappeared, after having healed ſuperficially, and opened again, many times: and, what is a very uncommon event, the obſtruction in the urethra at the ſame time vaniſhed by degrees, and he has now, for more than a year, been perfectly free from all complaint; and not only makes water freely, but is able to ride on horſeback with eaſe, which he had not done for many years.

"I think proper to add, that the above patient had almoſt from his infancy been troubled with aſcarides; which were once ſuppoſed to have been ſubdued by a ſpontaneous diarrhœa, but recurred in ſome weeks.

"1. From this inſtructive caſe I think it may be fairly concluded, that the ſtricture or caruncle in the urethra was the original cauſe of the whole diſeaſe; that by the obſtruction there given to the exit of the urine, the force to exclude it became exerted more violently; and thence the part of the urethra behind the ſtricture became diſtended, till it was at length ruptured. After this, the urine was preſſed into the cellular membrane, and diſſected its way, till a large ſurface became ulcerated. The ſame efforts which were uſed to exclude the urine, would preſs the matter out of this extenſive ulcer; and ſome urine would alſo at times be preſſed into it. Hence the matter always appeared mixed with the urine, and the ſmarting pain was urgent at the ſame time.

"2. We may conclude, with great probability, that the patient who died conſumptive from the abſorbed matter, as mentioned above, might have been ſaved for the preſent by proper punctures to have given exit to it; and that the eryſipelas and mortification in the latter patient, might alſo have been prevented or cured by a puncture or two, ſo made as to have evacuated the intermuſcular or anaſarcous urine, the irritation of which was probably the immediate cauſe of the eryſipelas and conſequent mortification.

"3. That the cure of theſe caſes, ſuppoſed to be catarrhs of the bladder, or ſuppurations of the proſtate gland, may moſt ſucceſsfully be undertaken by the aſſiduous uſe of bougies of catgut, which ſhould be gradually enlarged till a free paſſage for the urine be obtained. And if any tumor from extravaſated urine can be perceived and opened externally, the patient will be ſaved and the cure facilitated; ſince by theſe means ſufficient time might be gained to diminifh or deſtroy the ſtricture, or caruncle, by the uſe of bougies. The patient whoſe ſucceſsful caſe I have deſcribed, when the urine paſſed in part through the ulcer, and he was able to force ſome through the narrow part of the urethra, voluntarily and carefully ſtopt the further violent exertions of the veſical and abdominal muſcles, and was always very ſolicitous to let the urine paſs on in a ſmall ſtream, that leſs force might be exerted againſt the ruptured part of the urethra. This he thought contributed much to his cure.

" 4. Could the irritation of the aſcarides in the rectum inflame the membrane of the urethra by ſympathy, and thus be a remote cauſe of the ſtricture or obſtruction? I have twice remarked a polypus in the noſe in children, who were both much tormented by aſcarides; which, as well as other inteſtinal worms, occaſioned by ſympathy an itching in the noſtrils.

" 5. Were not the ſhivering fits owing to the urine inſinuating itſelf further into the cellular membrane, and thus producing new ſuppurations? and the more, as they never recurred after the ulcer was open, and permitted the paſſage of the urine through it?"

The curious fact of the ſolution of a bougie in the bladder in this patient, is thus deſcribed by Dr. Darwin: " The patient above deſcribed," ſays he, " who had been accuſtomed to uſe bougies, always before he made water, for two or three years together, fell aſleep with one of them in his urethra. The bougie was ſimply a piece of catgut, which from its ſoftneſs, when moiſtened, is liable to preſs forwards without being perceived. On waking next morning he miſſed the bougie, which could no-where be found by the moſt diligent ſearch. He continued the uſe of bougies as formerly, always before he made water; and thought he frequently felt a preſſure about the neck of the bladder. At the end of about four months, ſome filaments began to come away with his urine, and ſometimes ſtopt the ſtream of it for a time. Afterwards larger pieces of the catgut were voided of an inch long or more, which were untwiſted and ſeparated as if by putrefaction; and in a few months the whole was thus evacuated. He put ſome catgut into a bottle of water, which became very putrid, and, upon ſhaking the phial, obſerved it to ſeparate gradually into ſimilar pieces.

" This circumſtance furniſhes us with a powerful argument in favour of the uſe of catgut bougies, in preference to thoſe made of linen, ſince if by any accident one of them ſhould ſlip into the bladder, it will diſſolve (being an animal ſubſtance) by ſpontaneous putrefaction; and probably by that very proceſs prevent the formation or depoſition of the calculous matter upon it, which is ſo liable to incruſt other extraneous bodies that have accidentally got into the bladder."

We do not entirely concur with this eminent phyſician on the latter ſubject for the reaſons ſtated in our remarks on the bougie; and becauſe the poſſibility of a bougie being drawn into the bladder may be prevented by the ſimpleſt of all means, the tying a ſtring to it, and paſſing the ends round the penis, as is commonly practiſed.

SECT. IV. *Of* AMPUTATING *the* PENIS.

This operation is found neceſſary in certain diſeaſes which will not yield to other remedies; as in caſes of mortification and cancer. The following is the method of performing it:

A circular inciſion is firſt to be made through the ſound ſkin a little beyond the diſeaſed parts; the ſkin is then to be drawn back by an aſſiſtant, and the body of the penis divided by one ſtroke of the knife, immediately at the edge of the retracted ſkin. The principal arteries, which are two or three on each ſide, are next to be ſecured by ligatures; and if an oozing of blood ſtill continue, the ſurface of the ſore ought to be duſted with ſome ſtyptic powder. To allow the patient to make water, a ſilver canula (fig. 79) is to be introduced into the urethra, and retained there by two ſmall ligatures fixed to the ſide of the canula, their other extremities being faſtened to a bandage put round the body. The wound is to be dreſſed with ſoft lint, kept in its place by a piece of linen previouſly perforated for the introduction of the canula. The dreſſings are to be kept on by a narrow roller paſſed a few times round the penis, which, by gently compreſſing the penis upon the inſtrument, will effectually prevent any further diſcharge of blood. The after-treatment of the ſore ſhould be ſimilar to wounds in other parts of the body. But it will not be neceſſary to make any further compreſſion of the penis upon the canula, as the diſcharge of blood will, previous to this time, be entirely ſtopped. The tube is to be allowed to remain in the urethra during the whole time of the cure.

Before any operation of this kind is attempted, the ſurgeon ought to examine attentively, whether the diſeaſe be in the penis itſelf, or only in the ſkin, as the prepuce alone is frequently ſo much enlarged and otherwiſe diſeaſed as to give cauſe for ſuſpicion that the glans and body of the penis are likewiſe affected. This precaution is the more neceſſary, as ſeveral inſtances have occurred where the glans and body of the penis have been removed, and, after the operation, have been found perfectly ſound. Previous to amputation, therefore, where there is any cauſe for ſuſpicion, the prepuce ſhould be ſlit open, and the glans examined, ſo as to avoid amputating more than what is abſolutely diſeaſed.

It ſometimes happens that the frænum of the penis is ſo ſhort as to give conſiderable uneaſineſs in time of an erection. When this is the caſe, it may be ſafely divided by a pair of ſciſſars, or by a ſharp-pointed biſtoury, and the wound dreſſed with a little lint.

SECT. V. *Of the* FISTULA IN PERINÆO.

This term implies a ſinuous ulcer in the perinæum, commonly communicating with the urethra, but ſometimes opening into the bladder. The ſame term is alſo applied to ſimilar ſores opening into the ſcrotum, or into any part of the penis.

The diſeaſe may ariſe from wounds in the bladder, and of the urethra, from external violence; from a laceration of parts when performing the operation of lithotomy; from inciſion into the urethra for the extraction of calculi impacted there; from ſinuſes producing matter capable of corroding the membranous part of the urethra; from ſuppuration in the perinæum in conſequence of inflammation; from the urine paſſing through an opening in the urethra into the perinæum, or other neighbouring parts, and rendering the edges of the ſore callous: but moſt frequently the diſeaſe is occaſioned by ſtrictures in the urethra in conſequence of repeated venereal complaints.

"Strictures," ſays Mr. Home, "produce abſceſs in perinæo, which opens externally, and this opening gives a paſſage to the urine; nor can it be healed up while the obſtruction remains in the urethra, and prevents the urine from paſſing readily in its natural courſe.

"Upon this principle, which is I believe very generally underſtood, the only treatment of ſuch fiſtulæ in perinæo is the dilatation or the deſtruction of the ſtricture."

Some of Mr. Home's caſes, given in proof of this doctrine, will be detailed in our remarks on ſtrictures in the urethra. Theſe at the ſame time ſhew, that where fiſtulæ in perinæo have been formed, the parts behind the ſtricture are ſo much thickened, and are rendered ſo indolent, that the common bougie is unable to dilate them; and the lower ſurface of the urethra, in conſequence of inflammation and ulceration, where the fiſtulous orifices have their origin, is rendered ſo irregular that a bougie cannot readily paſs over it. If this is not underſtood, the ſurgeon may be led to miſtake the caſe, and ſuppoſe that there are other obſtructions which prevent the bougie from paſſing on. The flexible gum catheter is therefore, in ſuch inſtances, the only inſtrument by which the real ſtate of the canal can be aſcertained; ſince, when introduced with a ſtilet of metal which is bent to the curve of the urethra, the point of the inſtrument is always directed upwards, and avoids any irregularity on the lower ſurface which might obſtruct it.

In the *treatment* of this diſeaſe, when it is the conſequence of a ſtricture, the latter muſt be removed by cauſtic, or ſome of the uſual methods. If ariſing from a general affection of the ſyſtem, a removal of the primary diſorder is alſo neceſſary before a cure can be attempted. When the complaint is entirely of a local nature, a ſimple inciſion into the ſinus is all that is neceſſary; and for this purpoſe a ſtaff is to be introduced into the urethra, ſo as to paſs the opening at which the urine is diſcharged. A probe, or a ſmall director, is now to be paſſed at the external opening of the ſore till it reach the ſtaff; and cutting upon it, the ſinus is to be laid open through its whole length till it terminate either in the urethra, or, if neceſſary, in the bladder itſelf. When more openings than one are preſent, they are to be treated in the ſame manner; and if the ſinuſes are found to be remarkably hard, the removal of a ſmall portion of the diſeaſed part will expedite the cure, though the conſequent inflammation and ſuppuration will render this ſeldom neceſſary. After the operation, the wound is to be dreſſed with pledgets of emollient ointment, ſo as to allow it to fill up completely from its bottom. The whole is to be covered with a pledget of emollient ointment; and proper compreſſes being applied over it, the dreſſings are to be ſupported by a T bandage.

If ſymptoms of inflammation be violent, an emollient poultice is to be applied in the courſe of twenty-four hours after the operation: and as ſoon as free ſuppuration is formed, light eaſy dreſſings are to be uſed till the ſore is completely healed.

Mr. Latta's ſentiments on the treatment of fiſtulæ in perinæo are well illuſtrated in the following caſes, which appear in his Syſtem of Surgery, vol. ii. The firſt of theſe is ſomewhat remarkable.

Case I. "J. J. a man of 46 years of age, after a ſevere debauch with malt liquor, was ſeized with a ſtrangury. On making a very ſtrong effort, he found ſomething, as he expreſſed it, give way about three inches from the point of the penis, when, to his great aſtoniſhment, the bladder was ſuddenly emptied without a drop of water paſſing in the natural way. Immediately after this, a ſwelling with ſevere pain took place in the ſcrotum. Twelve hours after the accident," ſays Mr. Latta, "I ſaw him: he was almoſt diſtracted with pain; the tumor very hard, and much inflamed, reaching from the ring of the external oblique muſcle to near the middle of the thigh, and of a thickneſs proportionable to its length. He was extremely reſtleſs, his pulſe very quick, and rather feeble, and on every attempt to make water, he was ſenſible of its paſſing into the tumor; which was thus continually augmented in ſize, with a proportionable increaſe of pain.

"As the patient had enjoyed good health before this time, and had never been affected with any venereal complaint, I concluded that the whole aroſe from a complete and ſtrong contraction of the urethra, ſo that the canal itſelf had burſt immediately above the ſcrotum, and diſcharged the contents of the bladder into it. Concluding, therefore, that the contents of the tumor could be nothing but urine, I puſhed an abſceſs lancet directly into the tumor, near the centre, that is, about an equal diſtance between the abdominal ring and bottom of the ſcrotum. About ſix pounds of urine guſhed out, with almoſt immediate relief to the patient; the wound was dreſſed ſuperficially, with a little caddice moiſtened in oil, and gently inſerted between its lips; the whole ſcrotum being afterwards covered with cloths dipped in ſolution of lead. On attempting to introduce a bougie, I found that it could not be made to paſs further than two inches and an half, or at moſt three inches into the urethra; and it was four hours after the operation before I could paſs a bougie of the ſmalleſt catgut through the obſtructed part. During this interval, the urine paſſed wholly through the wound; but in twenty-four hours a bougie of conſiderable ſize could be introduced; and, on removing this when the patient had a deſire to void his urine, ſome of it always flowed the natural way, though the greater part continued to paſs by the ſcrotum.

"Thus, in a ſhort time, the pain and inflammation of the parts began to abate, but, by the continual diſcharge of urine into the ſcrotum, a ſwelling took place in the teſticle, which ſenſibly increaſed every time he made water. To take off this diſagreeable ſymptom, I drew off his urine regularly by the catheter four times a-day, by which the continual addition of ſtimulus was prevented; he was alſo blooded at the arm, and ten leeches afterwards applied at proper intervals; the whole being properly ſuſpended, and kept moiſt with ſolution of ſugar of lead. Thus, in ſix days from the time I began to uſe the catheter, the ſwelling was totally removed; but on laying it aſide for twenty-four hours, though he now paſſed more than one half in the natural way, the ſwelling began to return, recourſe was again had to the catheter, which it was found neceſſary to continue for three months, before the opening in the urethra was quite cloſed.

"During all this time the wound in the ſcrotum was carefully kept open, and every ten days an attempt was made by the patient to void his urine naturally, that it might be known whether the opening in the urethra was healed or not. As this opening diminiſhed, the quantity of urine paſſing by the wound was alſo diminiſhed, and the cure was at laſt ſo complete, that for ten years he has enjoyed perfect health, without the leaſt return of any ſymptom that could be ſuppoſed to ariſe from the former complaint. In this caſe, finding the abſolute neceſſity there was for preventing the urine from running through the wound, I propoſed to uſe the elaſtic catheter; but, after the patient had uſed an inſtrument of this kind for two days he was obliged to give it over, on account of the uneaſineſs it occaſioned, particularly a deſire to make water almoſt every half hour. On this account I had recourſe to the metallic catheter, as being the only method in my power to prevent the teſticle and ſcrotum from ſuffering much by the conſtant irritation of the urine.

Case II. "J. M. C. a man of 42 years of age, had, like the former patient, a ſtrangury after hard drinking. His complaint continued very ſeverely for fourteen days, after which he obſerved a ſwelling of conſiderable ſize at the root of the penis, near the anus. By advice of a medical gentleman who attended him, he put a poultice to this tumor, in conſequence of which, it was brought to a ſuppuration, and broke of itſelf. A conſiderable quantity of urine was voided through the opening, and this quantity continued daily to increaſe, appearing daily to inſinuate itſelf more and more into the cellular ſubſtance of the perinæum, and producing a high degree of inflammation, attended with great pain, and all the ſymptoms of an acute fever. Thus one ſuppuration ſucceeded another, until at laſt he was reduced to great diſtreſs, and applied to me after ſix months' illneſs. He was then very much emaciated; his ſcrotum ſwelled to very near four times its natural ſize, very much inflamed; and in ſome places of it were ſinuous openings, from which a conſiderable quantity of matter was diſcharged, part of it always coming along with the urine. There were two ſinuſes on each ſide of the rapha near the anus, through which matter was alſo diſcharged; the whole perinæum from the anus was very much ſwelled, and felt callous; in ſhort, when he voided his urine, it paſſed through twelve different holes in the ſcrotum and perinæum, attended with the diſcharge of much matter, and moſt exquiſite pain.

"On examining this man particularly, I found, that about four years before, he had had a gonorrhœa, which had laſted for five months; and, though then apparently cured, he had always a return of the running, with ſome degree of ardor urinæ, after any ſlight debauch; but theſe complaints conſtantly went off, upon taking a doſe of cream of tartar, or Glauber's ſalt, and keeping himſelf moderately cool for a few days. When I firſt viſited him, he had no pain or uneaſineſs in the perinæum, or under part of the ſcrotum; for that always went off after a perfect ſuppuration and free diſcharge of the matter, though the reſt of the ſymptoms continued as before. The inflammation went on very gradually, and ſeemed to be occaſioned by the urine inſinuating itſelf more and more into the cellular ſubſtance, which it inflamed as it went along. He paſſed very little water in the natural way; and, from a ſuppoſition that his caſe was venereal, he had taken ſuch a large quantity of mercury, both internally and by friction, that his mouth had been very ſeverely affected for near three months; the parts had alſo been covered with large emollient poultices of many different kinds, and he was become ſo weak, that he could not riſe out of bed. He had often been tempted to paſs a ſmall bougie into the bladder, but without ſucceſs, on account of a ſtricture near the neck. After ſeveral efforts, however, I was more fortunate, and got it completely introduced. At firſt, he was able to retain it only for about fifteen minutes, four times a-day; but, by gradually lengthening the time, while the ſize of the bougie was likewiſe increaſed, more and more of the urine came to be voided in the natural way; all the bad ſymptoms decreaſed, and he began to recover his ſtrength. Perſevering in the uſe of the bougie for three months, the whole of his urine at laſt paſſed the natural way. On account of the fœtor and bad condition of the ulcers, I made uſe of the carrot poultice; by the continuance of which, I had the ſatisfaction to find, that the hardneſs and pain gradually went off, and all the bad ſymptoms at laſt diſappeared. He has now continued well for four years, but generally introduces the bougie once in twenty-four hours, and keeps it in for an hour at a time."

CASE III. "J. D. 36 years of age, having drunk rum punch very freely one afternoon, was attacked with a difficulty of making water, attended with heat, and frequent and very painful urgings to void his urine, which after all paſſed only in drops. In conſequence of the continuance and increaſe of theſe ſymptoms, he had been obliged to make uſe of the catheter twice a-day for fourteen days, after which his urine paſſed the natural way, though ſtill with great pain and difficulty. In four weeks from the firſt attack, I ſaw him. He had then a ſwelling in the perinæum of the ſize of an hen's egg; which, being pretty ſoft, I opened at the moſt prominent place with a lancet, and thus gave vent to about two ounces of matter, ſeemingly of a good quality. An emollient poultice was applied over the dreſſings, and ordered to be renewed every two days. Thus the ſwelling ſoon diſappeared, as well as the other bad ſymptoms; but a few drops of urine were now obſerved to come away by the wound every time he made water. This continued for ſeveral weeks, during which time the external wound was carefully kept open, by inſerting a little caddice dipped in oil between its lips, to prevent the urine from inſinuating itſelf into the cellular ſubſtance, but when the diſcharge in this way had ſtopped, the opening was allowed to heal up, and the patient went to the country, thinking that his cure was complete. But, in about twelve months after, having been fatigued, and getting cold, he was again attacked by this diſorder, the ſtrangury. It was ſoon got the better of, by uſing the cluniluvium, and keeping moderately cool; but after it went off, he perceived a little fulneſs in the cicatrix of the old wound. On applying poultices for three days, it broke, and diſcharged a quantity of matter mixed with water. Having been in the cuſtom of dreſſing his wound formerly, he treated it again in the ſame way, but not with the ſame ſucceſs; for the urine having inſinuated itſelf into the cellular ſubſtance lying backwards in the neighbourhood of the anus, a conſiderable ſwelling took place, attended with great pain and inflammation. At laſt it broke in two different parts near the verge of the anus, and he was obliged to apply to me.

" At the time I ſaw him again, the urine was diſcharged at three openings, the one near the bulb of the urethra, and one on each ſide of the hips; the ſinus of the former running downwards and backwards to the neck of the bladder, and of the two latter upwards and inwards to the ſame place. The adjacent parts were much hardened, the openings become truly fiſtulous, and the hardneſs and pain conſtantly ſpreading over new-ſpace; but there was no obſtruction to the paſſage of the urine in the natural way, and the quantity of matter diſcharged with it never exceeded half an ounce at a time. As it now appeared neceſſary, however, to lay open all the ſinuſes to the bottom, I prepared him by a gentle laxative and injection, after which I began the operation by introducing into the neck of the bladder the grooved ſtaff uſed in lithotomy, a ſtrong probe into the ſinus on the right ſide of the rapha, and with a round edged ſcalpel laid the whole open to the bottom. In like manner I proceeded with the reſt, and found that all the three terminated at the membranous part of the urethra. Towards the neck of the bladder a ſmall opening was diſcovered in the urethra, near the proſtate gland. I enlarged this opening in the urethra to half an inch, to promote the free diſcharge of urine during the ſuppuration of the callous edges of the ulcer. The wound was ſlightly dreſſed with caddice dipped in oil, and the patient put to bed, and afterwards treated in the ſame manner as if he had been cut for the ſtone.

" The firſt time this patient made water after the operation, more than one half of it paſſed by the wound, and this continued for ſix days, for the laſt four of which the parts were conſtantly covered with an emollient poultice, to promote the digeſtion of the hardened parts. In 14 days, little or no water was diſcharged by the wound; and during the whole courſe of the cure no medicine was found neceſſary, excepting twice an injection. The wounds healed up in the ſame manner as thoſe which heal favourably after the operation of lithotomy. In about eight weeks they were completely whole, and for three years and a half he has remained free of every complaint.

SECT. VI. *Of* OBSTRUCTIONS *in the* URETHRA.

OBSTRUCTION of the urethra frequently occurs after repeated or ſevere attacks of the venereal diſeaſe; but it is by no means excluſively occaſioned by the latter.

Cauſes.] They may be owing to caruncles or fleſhy excreſcences in the urethra; to tumors in the lining membrane, or parts contiguous to the urethra, in conſequence of inflammation; to ſpaſmodic affections of the urethra; or to ſtrictures properly ſo called.

Formerly almoſt every inſtance of obſtruction in the urethra was attributed to *caruncles*, but their occurrence is much leſs frequent than was imagined. They are rarely found except near the point of the urethra. They are conſidered to be nearly of the ſame nature with the warts which grow upon the prepuce or root of the glans in venereal caſes. Tumors obſtructing the paſſage of the urine may be occaſioned either immediately by inflammation, or in conſequence of old ſores within the urethra; or tumors, from whatever cauſe, may be ſeated in the corpora cavernoſa contiguous to the urethra, and may preſs upon it in ſuch a manner as to cauſe an adheſion of its ſides, and thereby produce ſtoppage of the urine. Spaſmodic ſtrictures of the urethra ſometimes ariſe from ſtone in the bladder. Sometimes in gonorrhœa there is ſuch a degree of contraction that neither ſtaff nor bougie can enter. This variety of obſtruction is known by its coming on ſuddenly, and going off ſometimes almoſt completely in the ſpace of a few hours. Of the permanent ſtricture, or ſtricture properly ſo called, Mr. Hunter obſerves, that in moſt of the caſes of this kind which he has ſeen, the diſeaſe extends no further in breadth than if the part had been ſurrounded with a piece of packthread. He has however ſeen the urethra irregularly contracted for above an inch in length, owing to its coats or internal membrane being irregularly thickened, and forming a winding canal. He further obſerves, that a ſtricture does not ariſe, in all caſes, from an equal contraction of the urethra all round; but in ſome, from a contraction of one ſide, which throws the paſſage to the oppoſite ſide, and often makes it difficult to paſs the bougie. In ſome few caſes, he ſays, there are more ſtrictures than one; he has ſeen half a dozen in one urethra, and finds that the bulbous part is much more ſubject to ſtrictures than the whole of the urethra beſides; that they are ſometimes on this ſide of the bulb, but very ſeldom beyond it; and that they are often ſlow in forming, it being frequently years from the time they are perceived before they become very troubleſome. Contrary to the opinion of ſome, Mr. Hunter doubts very much if the ſtricture commonly, or even ever, ariſes from the effects of the venereal diſeaſe, or the method of cure; for ſtrictures are common to other paſſages, and ſometimes happen in the urethra where no venereal complaint had ever been.

Treatment.] When obſtructions are occaſioned by caruncles in the urethra, bougies ſhould be introduced, rubbed over with bland oil until a reſiſtance is met with. When a bougie cannot be introduced far enough, one with a ſmaller point is to be uſed, but not till the day following, leſt the part be too much irritated. They ought not to be allowed to remain long at firſt, particularly when they occaſion a conſiderable degree of pain.

When ſuppreſſion of urine ariſes from *ſwellings in or about the urethra*, in conſequence of inflammation, an attempt ſhould be made to diſcuſs theſe immediately, or bring them into a ſtate of ſuppuration, and diſcharge the pus as ſoon as it is formed. But when the nature of the tumor is ſuch as not to terminate in either of theſe ways, extirpation of the diſeaſed parts, when this is found practicable, is the only probable means of relief. Bougies ſhould at the ſame time be uſed to aſſiſt in the cure.

When *ſpaſmodic affections* are preſent in the urethra, the remedies to be employed are, warm emollients, as rubbing the part with warm oil; anodynes, as opium given by the mouth, but more eſpecially by the anus; blood-letting in plethoric habits, and this to be generally and locally applied; bliſters put to the penis or perinæum; electricity, after plethora has been removed. Some caſes may be treated with bougies; but where the diſeaſe is purely ſpaſmodic, they are generally found to be hurtful; though in other caſes, when the violence of the diſeaſe is ſo far removed, if they can be introduced, they are of ſervice, by relieving any obſtructions which may remain after the remedies above mentioned have been exhibited. Coſtiveneſs ought likewiſe to be guarded againſt. The permanent ſtricture is to be cured by bougies or by cauſtic.

By the bougie.] Bougies act ſolely by preſſure, and by dilating the part; hence they ſhould be ſo large as to fill the paſſage, and ſufficiently flexible to be eaſily introduced. They have been prepared from various receipts which it is ſcarcely worth while to enumerate; the ingredients being, for the moſt part, alike, but differing in their proportions. We ſhall therefore confine our account to the following compoſitions, the former of which is recommended by Mr. Hunter.

(No. 141.) ℞ Olei olivæ lib. iij.
Ceræ flavæ lib. j.
Minii lib. iſs.

Theſe are to be boiled together over a ſlow fire for ſix hours. Bougies made with this compoſition will be found much too ſoft for immediate uſe, but after keeping ſome months will acquire ſufficient firmneſs. If this be an objection, however, it may eaſily be removed, and the plaſter made of a ſtiffer conſiſtence, by adding two or three ounces more wax, and the like quantity of minium, and continuing the boiling till the latter is diſſolved.

Bougies ought to be ſmooth and ſupple, and yet of ſufficient firmneſs to admit of being pretty ſtrongly urged by the hand of the ſurgeon, without bending or twiſting in the urethra. They are formed of narrow ſlips of thin linen rag, which, after being equally dipped into the melted compoſition, are firmly folded up and afterwards rolled on a marble ſlab till their ſurface is perfectly uniform. Their ſhape ſhould be nearly equal except towards the point, which ſhould taper very gradually for about the length of an inch.

A tolerably good compoſition for bougies may alſo be formed with litharge plaſter and yellow wax, to which may be added, a ſmall quantity of red ſulphurated quickſilver. The following formula is from Swediaur:

(No. 142.) ℞ Ceræ flavæ lib. j.
Spermatis ceti drach. iij.
Ceruſſæ acetatæ drach. ij. ad viij.

Theſe are to be boiled together as in the former inſtance, and the proportion of acetated ceruſe regulated according as the bougies are deſigned to be of a firmer or a weaker conſiſtence. When of a large ſize they ſhould always be of the latter deſcription, that they may the more readily conform to the ſhape of the paſſage when introduced.

Mr. Bell has given us the following ſtill more ſimple formula for the compoſition of bougies:

(No. 143.) ℞ Emplaſtri lithargyri unc. iv.
Ceræ flavæ unc. iſs.
Olei olivæ drach. iij.

We are directed to melt the wax and oil in one veſſel, and the litharge plaſter in another, and afterwards to mix them together. Poſſibly by this precaution, and by melting the plaſter very gradually, we may prevent the great number of air-bubbles which generally are let looſe in this kind of compoſition, and which prove extremely inconvenient in dipping the ſtrips of linen.

Bougies are likewiſe formed of catgut, a ſubſtance well calculated to penetrate a ſtrictured part in the firſt inſtance, as it admits of being made ſmaller than the plaſter bougie, and yet poſſeſſes a ſufficient degree of elaſticity and ſtrength to allow of being puſhed forward with ſome force. Catgut bougies are alſo well calculated to paſs through an aperture which takes a winding ſort of direction, a caſe in which the common bougie very frequently fails. They do leſs however towards *dilating* the ſtricture than is generally ſuppoſed, as they ſoon become ſoft and flabby, and in that ſtate, rather yield to the preſſure of the ſtricture, than produce the effect of dilating it.

A new invention, in which catgut is involved in elaſtic gum, is perhaps one of the greateſt improvements lately made in the compoſition of ſimple bougies. The gum defends the catgut from the moiſture of the part whilſt the latter offers a ſufficient reſiſtance to the ſtrictured part.

There are alſo *flexible metallic bougies*, a late invention of Mr. Smyth, an apothecary, in London, who, in the following terms, recommends "*two* kinds of bougies, which, for ſmoothneſs, firmneſs, and pliability, will be found, by compariſon, ſuperior to any that are at preſent in uſe.—The *firſt* of theſe are *ſolid*, but at the ſame time as *flexible* as thoſe made of common plaſter, and poſſeſſed of ſtrength and firmneſs enough to overcome any obſtruction that *ought* to yield to preſſure. They are alſo of ſo ſmooth a ſurface, that they may be introduced with eaſe, and ſo durable, that one caſe, containing twelve bougies of different ſizes, with a little care, will laſt a ſurgeon in full practice for many years.—The *ſecond* are *hollow*, and of ſizes ſimilar to the ſolid ones, finiſhed with a ſtilet, or wire, of the ſame metal, for caſes where it is judged proper to let them remain in the bladder; but in ſtrictures requiring greater force than can be exerted with theſe bougies, as they are conſiderably ſofter than the ſilver catheter, a temporary braſs, or iron wire, will give them ſufficient ſtrength for their introduction. *Theſe* bougies, both ſolid and hollow, will take any degree of curvature that may be thought neceſſary by the operator previous to their introduction, without being injured thereby; and may be continued in the paſſage any length of time without danger of breaking, or giving the leaſt pain; this he aſſerts from his own knowledge, having worn one of the larger ones, in ſome meaſure for the ſake of the experiment, eight or nine hours at a time. They cannot be affected by the warmth of the parts to which they are applied, nor acted upon by the ſtricture, as frequently happens, particularly in the ſpaſmodic contraction of the urethra, nor by the urine, which is always the caſe when the plaſter bougie or elaſtic gum catheter is uſed. They may be had of any ſize, or degree of flexibility; and when tarniſhed, they may be repoliſhed with a piece of ſhamoy leather and a little whiting. They are of a conical form, and their action is purely mechanical."

The manner of uſing theſe bougies (which indeed applies to the introduction of *any other)* is thus deſcribed:

"Take one of the ſmaller ſizes, and draw it between the finger and thumb to feel whether it be perfectly ſmooth; if that be the caſe, then take a little ſweet-oil and rub it all over, that it may paſs the eaſier. The patient may either ſtand, or ſit in a chair inclining backwards, or lie in bed with his knees drawn up, which latter poſition is preferable to either. He may then take hold of the *penis*, near the *glans*, with one hand, and extend it gently, that the urethra may not be wrinkled, and with the other, introduce the round end of the bougie, which ſhould be traced with a finger externally, in order to keep it in a right line with the urethra, and it will then meet with no impediment but what is occaſioned by the diſeaſe. When it meets with any reſiſtance, the patient may turn it round gently with his finger and thumb ſeveral times, and as he turns it, preſs it a little forwards, and continue ſo to do, until he paſs the obſtruction, which is all that is neceſſary. This bougie ſhould remain ſome time in the paſſage, and when withdrawn, another a little larger be introduced, continuing the ſame operation once or twice a-day, and gradually increaſing the bougie to the ſize thought proper."

Notwithſtanding what is ſaid, however, on this ſubject, we are not amongſt thoſe who give a decided preference to the metallic bougie; which, perhaps, in certain caſes, may prove a very uſeful inſtrument, particularly in thoſe where the *laceration of a ſtricture* is intended by the ſurgeon.

Bougies, when properly made, can ſometimes be kept in for ſix or eight hours together; but the length of time proper for their retention muſt depend much upon the feelings of the patient. At all times when they give much pain they ought to be removed, and not introduced again till the part is in a ſtate fit for receiving them. They ſhould be gradually increaſed in their ſize, till the paſſage returns to its natural dimenſions. They ought to be continued for ſome time after, till it appear that there is no danger of a return of the complaint.

Cure by cauſtic.] Mr. Hunter very ingeniouſly employed lunar cauſtic in the cure of ſtrictures in the urethra. His original method was to paſs it down through a metal canula till it came in contact with the diſeaſed part; but as that was found liable to great objections, he afterwards adopted, and ſince his death, his ingenious relation, Mr. Everard Home, has ſucceſsfully practiſed the following improvement:

" Take a bougie, of a ſize that can be readily paſſed down to the ſtricture, and inſert a ſmall piece of lunar cauſtic into the end of it, letting the cauſtic be even with the ſurface, but ſurrounded every-where laterally by the ſubſtance of the bougie. This ſhould be done ſome little time before it is required to be uſed; for the materials of which the bougie is compoſed become warm and ſoft by being handled, in inſerting the cauſtic; and therefore the hold the bougie has of the cauſtic is rendered more ſecure, after it has been allowed to cool and harden. This bougie, ſo prepared, is to be oiled and made ready for uſe; but previous to paſſing it, a common bougie of the ſame ſize is to be introduced down to the ſtricture to clear the canal, and to meaſure exactly the diſtance of the ſtricture from the external orifice; this diſtance being marked upon the armed bougie, it is to be paſſed down to the ſtricture, immediately upon the other being withdrawn. In its paſſage, the cauſtic is ſcarcely allowed to come in contact with any part of the membrane, the *point* of the bougie, of which it forms the *central part*, always moving in the *middle line* of the canal; and indeed the quickneſs with which it is conveyed to the ſtricture prevents any injury to the membrane, were it is accidentally brought to oppoſe it. In this mode the cauſtic is paſſed down with little or no irritation to the lining of the urethra; it is applied in the moſt advantageous manner to the ſtricture, and can be retained in that ſituation the neceſſary time to produce its effects."

The alleged advantages of this method are, that it produces a permanent cure, which the bougie does not, that the pain conſequent on its application is inconſiderable, and that neither irritation nor inflammation are found to ſupervene. Some inconveniences however may, and now and then do, occur; and Mr. Home has, in a late edition of his "Practical Obſervations, on the Treatment of Strictures," conſidered them in a very candid manner, and at the ſame time given what we think deciſive reaſons why, at leaſt in caſes that do not yield to dilatation by the common bougie, the *cauſtic* ought to be reſorted to. In his ſection "on the effects of the cauſtic on ſtrictures," he ſays, "againſt this practice objections have been formed, and many bad conſequences have been attributed to it, which it certainly does not produce: for whatever, *à priori*, might be ſuppoſed the effects of ſo violent an application, to a membrane ſo ſenſible and irritable as the urethra, and I will admit that it is very natural to conceive they would be very ſevere, the reſult of experience, the only thing to be relied on, evinces the contrary. The pain that is brought on is by no means violent; and neither irritation nor inflammation is found to take place.

"That caſes do occur, in which ſtrictures have produced ſo much miſchief, and rendered ſo great an extent of the canal diſeaſed, that the uſe of the cauſtic has proved unſucceſsful, is certainly true; and ſeveral of theſe caſes have fallen within my own knowledge. But when it is ſtated, that none, even of theſe, were made worſe by its uſe; that no bad conſequences attend it; and that no other mode, at preſent known, is equally efficacious; any occaſional want of ſucceſs cannot be conſidered as an objection to this mode of practice.

"But if the apprehenſion of violent effects from the cauſtic, however ill-founded, cannot be removed, let the alternative be conſidered; namely, the only operation previouſly in uſe, where a ſtricture cannot be dilated by the bougie.

"In thoſe caſes we are obliged to have recourſe to means certainly more ſevere and violent, laying open with a knife the diſeaſed urethra, and paſſing through the divided parts a flexible gum catheter into the bladder. This I have done myſelf, and have frequently ſeen it performed by Mr. Hunter, and it always ſucceeded; neither bringing on ſo much inflammation as was expected, nor being attended with any ſymptoms of irritation.

"This practice has by other ſurgeons been carried ſtill further; the portion of diſeaſed urethra has been diſſected out, and entirely removed; nor has ſo ſevere an operation always brought on untoward ſymptoms; and patients have recovered.

"If the membrane of the urethra when diſeaſed, is capable of ſuffering ſo much injury, without any conſequent ſymptoms of irritation, it cannot be doubted that it will bear with impunity to be touched, in a very partial manner, ſeveral different times with lunar cauſtic."

After having placed the merit of the invention, as well as the mode of applying it, where it was due; Mr. Home very properly reſerves to himſelf the merit of theſe attempts to render it more generally uſeful.

"Having," ſays he, "met with a number of facts, from which a general principle appears to be eſtabliſhed, that the irritable ſtate of a ſtricture is kept up, and even increaſed, by the uſe of the bougie, but leſſened and entirely deſtroyed by the application of lunar cauſtic; I am deſirous to communicate my obſervations upon theſe facts, and to recommend the uſe of the cauſtic, in many caſes of irritable ſtricture, *in preference to the bougie.*

"As the uſe of the cauſtic upon this principle is, I believe, entirely new, and is contrary to every notion that had been formed upon the ſubject, it will require ſomething more than general aſſertion, to gain even the attention of many of my readers, ſtill more their belief; I ſhall therefore detail the circumſtances as they occurred, by which I conceive the propriety of this practice to be eſtabliſhed; and afterwards make ſome obſervations upon the principle on which it depends.

"My connection in practice with Mr. Hunter, afforded me opportunities of attending to caſes of ſtricture, in all their different ſtages; many of them brought on during a long reſidence in India, attended with great irritability, and exceedingly difficult of cure.

"One caſe of this kind, which I ſhall preſently relate, admitted the paſſing of a ſmall bougie; but in the courſe of three years, very little was gained by a ſteady perſeverance in the uſe of that inſtrument, either in dilating the canal, or palliating the ſymptoms of ſtricture; this made me look upon the bougie as leſs efficacious than I had always been taught to believe it. I was willing, however, to conſider this as an uncommon caſe, depending more on the peculiarities of the patient's conſtitution than on the nature of the diſeaſe: but I found, on a particular enquiry, that ſeveral other gentlemen from India were under circumſtances nearly ſimilar; the bougie only preventing the increaſe of the ſtricture, but being unable to dilate it beyond a certain ſize; and when it was left off, the ſtricture in leſs than two months returned to its former ſtate of contraction.

"What plan ought to be followed in ſuch caſes I was then unable to determine; but that the bougie could not be depended on was evident. During this ſuſpenſe, the following caſe came under my care.

Case I. "In Auguſt, 1794, a gentleman conſulted me for ſome ſymptoms which had been conſidered as indicating the preſence of gonorrhœa; but as they did not yield to the common treatment in the uſual time, he was induced to take my advice reſpecting the nature of his complaint. In the neceſſary enquiry to obtain a perfect hiſtory of the caſe, among other things it was ſtated, that, nineteen years before, there was a ſtricture which became very troubleſome, and that Mr. Hunter, by the deſire of the patient, had applied the cauſtic, by which the ſtricture was removed, and never after returned. He ſaid that he was one of the firſt perſons on whom the cauſtic had been uſed. From this account I was naturally led to believe that the ſtricture had gradually returned, and was now increaſed ſo much as to produce the preſent ſymptoms; a diſcharge being almoſt always a ſymptom of ſtricture, when it is much contracted: but upon examining the canal, a bougie of full ſize paſſed on to the bladder without the ſmalleſt impediment. I therefore took up the caſe as an inflammation in the urethra; and large doſes of the balſam copaiva, given internally, effected a cure.

“ The circumſtance of a ſtricture having been removed nineteen years before, and not returning, made a ſtrong impreſſion on my mind; and made me deſirous to aſcertain whether this practice could not be employed in caſes of ſtricture in general, and the cure produced by it, equally permanent. A ſhort time after, I had an opportunity of trying it in the following caſe.

Case II. “ A captain in the Eaſt-India Company's ſervice, in September, 1794, applied to me for aſſiſtance. His complaints were, great irritation in the urethra and bladder, conſtant deſire to make water, and an inability to void it, except in very ſmall quantities. Theſe ſymptoms had been at firſt ſuppoſed to ariſe from gonorrhœa, afterwards rendered more ſevere by catching cold; but not yielding to the uſual remedies for gonorrhœa, they were inveſtigated more minutely, and a ſtricture was diſcovered in the urethra. The mode of treatment was now changed, and the bougie employed; but its uſe aggravated all the ſymptoms, and brought on ſo great a degree of irritability on the bladder and urethra, that there was an alarm for the patient's life, which was the reaſon of applying for my aſſiſtance.

“ Beſides the local ſymptoms, this patient had thoſe of quick pulſe, white tongue, hot and dry ſkin, loſs of appetite, and total want of ſleep, with frequent attacks of ſpaſm on the bladder and urethra. A very ſmall flexible gum catheter was paſſed, and the water drawn off, in quantity about a pint, which gave him great relief; this was repeated morning and evening, to keep the bladder in as eaſy a ſtate as poſſible; but in other reſpects he continued much the ſame.

“ As the preſent ſymptoms were brought on by the uſe of the bougie, little good was to be expected from that inſtrument; and where the urethra had been ſo eaſily irritated, and was diſpoſed to continue in that ſtate, there was no proſpect of the uſe of the bougie afterwards effecting a cure. Theſe circumſtances I explained to the patient; and mentioned, in proof of my opinion, the caſe in which ſo little had been effected in three years.

" I then propoſed to him a trial of the cauſtic, with a view to deaden the edge of the ſtricture, as the only probable means of effecting a cure. The degree of irritation was already great; I was, however, led to believe, that the application of the cauſtic was not likely to increaſe it; ſince by deſtroying the irritable part, it might leſſen, and even remove, the ſpaſmodic affection; but if, contrary to my expectation, the irritation continued, we ſtill ſhould be able to draw off the water, as the ſlough formed by the cauſtic would prevent the edge of the ſtricture from acting, and obſtructing the inſtrument.

" The application of the cauſtic was, upon theſe grounds, determined on; and it was applied in the following manner.

" I paſſed a common bougie, nearly the ſize of the canal, down to the ſtricture, to aſcertain its exact ſituation, and to make the canal of the urethra as open as poſſible. The diſtance was then marked upon a bougie armed with cauſtic, of the ſame ſize, which was conveyed down as quickly as the nature of the operation would admit. It was retained upon the ſtricture, with a ſlight degree of preſſure; at firſt there was no pain from the cauſtic, but a ſoreneſs from preſſure; in leſs than a minute, a change was felt in the ſenſation of the part, it was at firſt a heat, ſucceeded by the burning pain peculiar to cauſtic: as ſoon as this was diſtinctly felt, the bougie and cauſtic were withdrawn, having remained in the urethra about a minute altogether. The ſoreneſs, he ſaid, was entirely local, by no means ſevere, was unaccompanied by irritation along the canal, and he thought the uneaſineſs in the bladder diminiſhed by it. He deſcribed the pain as reſembling very exactly the firſt ſymptoms of gonorrhœa. This ſenſation laſted half an hour after withdrawing the bougie.

" The cauſtic was applied about one o'clock in the forenoon, and he paſſed the day more free from irritation than he had been ſince the beginning of the attack, which had laſted ſix days. In the evening the water was drawn off with more eaſe than the night before. He paſſed a tolerable night, and the next day continued free from irritation. On the third day the cauſtic was again applied in the forenoon; the painful ſenſation was leſs than on the former application, laſted a ſhorter time, and in an hour after the armed bougie was withdrawn, he made water freely for the firſt time ſince the commencement of his indiſpoſition. He ſaid the irritation in the bladder was removed, and he felt very well. His appetite returned, he ſlept well, and continued to void his urine with eaſe.

" In this ſtate nothing was done till the fifth day, leaving always a day between the applications of the cauſtic.

" On this day a common-ſized bougie went readily into the bladder; it was immediately withdrawn, and the cure was conſidered as complete; no bougie was afterwards paſſed, leſt it might bring back an irritation upon the paſſage. I met this gentleman twelve months after, and he aſſured me he had continued perfectly well, and I have ſince learned that in three years there has been no return.

" From the reſult of this caſe, I was encouraged to hope that the cauſtic might be applied to ſtrictures in the urethra with more confidence than I had hitherto believed, ſince it evidently did not bring on or increaſe the general irritation; but on the contrary, ſeemed to allay it.

" In this caſe it had taken off the diſpoſition to ſpaſm, which appeared to me, as I have already ſtated, an object of the greateſt importance in the treatment of ſtricture in all its ſtages. One inſtance by no means afforded ſufficient evidence to eſtabliſh the general propriety of this practice; it juſtified, however, further trials, and induced me to proſecute the enquiry.

" The caſe I have already alluded to, as having diſcouraged me more than any other in the uſe of the bougie, appeared to be a very proper one for the trial of the cauſtic, and for comparing its effects with thoſe of the bougie, particularly as it had been of very long ſtanding, and the bougie had been perſevered in with great patience, for a ſufficient length of time, without any conſiderable benefit. I had an opportunity of trying it, and ſhall therefore ſtate the whole caſe here, rather than give it in detached parts.

CASE III. " The gentleman was a lieutenant-colonel in the Eaſt-India Company's ſervice, forty-two years of age, had been many years reſident in India, and during twelve of them had more or leſs difficulty in making water. He came to England in 1791, and put himſelf under the care of Mr. Hunter. Upon paſſing a bougie, there were found to be two ſtrictures in the urethra, one three inches from the external orifice, the other at the bulb. The canal was extremely irritable, and a bougie if allowed to remain in it for ſeveral minutes, produced uneaſineſs. The firſt ſtricture was, after a conſiderable time, gradually dilated; and then a ſmall bougie was paſſed through the ſecond into the bladder; after this had been continued daily, a few minutes at a time, for about a week, one a ſingle ſize larger, was introduced. This larger bougie had been uſed for two days without any pain; but on the third the patient, immediately after it was withdrawn, walked nearly a mile; he felt a little uneaſineſs, which he attributed to the walk. This was followed by a ſpaſmodic irritation in the urethra and bladder, and in the evening a complete ſuppreſſion of urine took place: in this ſtate he remained all night, taking opium, and uſing other modes of relief, but without effect.

"About four o'clock in the morning a bougie was paſſed down to the ſtricture, and allowed to remain there, preſſing againſt it. This application was continued for fifteen minutes; the ſpaſm began to abate, allowing a few drops of urine to paſs, and in a few hours it went gradually off.

"The bougie was now laid aſide; ſome time after it was again tried, and things went on tolerably well for about ten days, when an uneaſineſs was felt in the perinæum, and a hardneſs diſcovered there, which made it neceſſay again to leave it off. This hardneſs increaſed, and formed a very large abſceſs in perinæo, which was opened. It contained about three ounces of matter, but had no communication with the urethra; and in two months healed up. When the parts were perfectly recovered, as there ſeemed to be no alternative, the bougie was again reſorted to; and as the common ſort did not lie in the paſſage without giving uneaſineſs, thoſe of a ſofter kind were tried, and found to anſwer better; but unfortunately whenever they were regularly perſevered in, they brought on, in leſs than two months, a local irritation, attended with conſtitutional indiſpoſition, which made it neceſſary to omit them for a week or a fortnight. From theſe circumſtances, at the end of three years, a bougie of no conſiderable ſize, compoſed of the ſofteſt materials (white wax and oil, in nearly equal proportions), could only be retained for ten minutes without irritation; but if uſed regularly longer than a month, irritation came upon the parts.

"After having ſuffered ſo much under the courſe of bougies, the patient was willing to make trial of the cauſtic, and on the 20th of November, 1794, it was applied to the ſtricture, neareſt to the orifice of the urethra, which at this time did not admit a bougie of half the common ſize; the effect of the cauſtic, after remaining a minute on the ſtricture, was local ſoreneſs, but no irritation; the ſoreneſs continued a quarter of an hour, and went off. The ſenſation was totally different from the uneaſineſs he had always experienced while a bougie was retained in the ſtricture, and although more acute, was by no means ſo difficult to bear; this was ſo decidedly his opinion, that as ſoon as the cauſtic was removed, from which he had expected very ſevere effects, he declared that he would at any time prefer the application of the cauſtic to having a bougie paſſed through the ſtricture. It was applied again on the 22d, and produced the ſame effects in a leſs degree. On the 24th, a full-ſized bougie was readily paſſed through the firſt ſtricture, down to the ſecond. The cauſtic was now applied to this ſtricture; after uſing it three times, with the interval of a day between each application, a full-ſized bougie could be puſhed on to the bladder, but did not paſs with eaſe; the cauſtic was therefore uſed a fourth time, and then the bougie went into the bladder, and he made water freely. Thus, in fourteen days, by means of the cauſtic, a full-ſized bougie was paſſed into the bladder without the ſmalleſt degree of irritation; an object which could not be effected by dilating the paſſage with a bougie for three years together. As the urethra had proved to be ſo very irritable, it was not thought prudent to uſe a bougie, the parts were therefore left to themſelves.

" In the beginning of February, 1795, this patient caught cold, and was confined to his bed with a fever, and ſymptoms of oppreſſion upon his breaſt, from which his life was conſidered in danger. For theſe complaints he was twice bled freely, and otherwiſe much reduced; during the whole of this illneſs there was no return of his ſtricture, or irritation in the bladder; but while he remained in the weak ſtate in which it left him, on the 14th of February, he had in the night a frequent deſire to make water, which paſſed in ſmall quantities, and towards the morning he had ſome irritation in the bladder. He ſent for me, a good deal alarmed at this return, after having been ten weeks free from the complaint. I ſaw him at eleven o'clock. On hearing his account of the ſymptoms, I objected to the uſe of the bougie, as it had always increaſed the irritation when employed.

" The application of the cauſtic to the ſtricture appeared to me a preferable meaſure, ſince in its preſent contracted ſtate, it would be more certainly oppoſed to the cauſtic, and more effectually deſtroyed. This was immediately agreed to; and in five minutes after it had been uſed the ſpaſm went off, and he made water with eaſe to the quantity of half a pint, which emptied the bladder, and entirely removed the irritation. As the ſtricture had evidently in ſome degree returned, and as I conceive that the only chance of a permanent cure depends upon the contracted part being equally dilated with the reſt of the canal, or nearly ſo, I was not ſatisfied with his making water freely, and returned to the uſe of the cauſtic, to procure ſo deſirable an effect. It was again applied, twice to the firſt ſtricture, and twice to the ſecond; after which a full-ſized bougie could be paſſed readily into the bladder. As this return might be attributed to leaving the urethra entirely to itſelf, after the uſe of the cauſtic, it was now judged proper to paſs a bougie once a-day, five minutes each time, for a fortnight, and then once a month, to aſcertain the ſtate of the canal; at the end of four months I had an opportunity of paſſing a bougie, and at that time the ſtricture had not in the ſmalleſt degree returned. This gentleman went to India, and has had no return of the ſymptoms of ſtricture."

From the reſult of theſe caſes, Mr. Home was ſatisfied that he had diſcovered an effectual mode of treating thoſe ſtrictures, *which do not admit of being relieved by the uſe of the bougie.* He accordingly adopted this mode of treatment as a general practice: yet far from concealing the difficulties which he occaſionally had to encounter, he employs a ſubſequent ſection to detail the "circumſtances under which the uſe of the cauſtic proved unſucceſsful." As a true eſtimate of the merits of this practice is of the laſt importance in a practical view, we ſhall ſelect from this part of Mr. Home's work, what is principally ſtated, alſo ſome of thoſe caſes in which the ſucceſs of the cauſtic is ſpoken of in its application under peculiar circumſtances.

"In ſome conſtitutions," ſays Mr. Home, "where the patients have reſided long in warm climates, every time the cauſtic is applied to a ſtricture, a regular paroxyſm of fever, called by the patient an ague, takes place; and this has been ſo violent as to render it impoſſible to purſue this mode of practice. Of this I have met with two inſtances. I conſider this diſpoſition to fever, as the effect of climate, and not of any natural peculiarity of conſtitution; for the brother of one of theſe patients laboured under the ſame diſeaſe, but as he had not been in warm climates, it was removed by the cauſtic without his experiencing ſuch attacks.

"In *gouty* conſtitutions, attacks of the gout have in two inſtances brought on ſpaſmodic conſtrictions, after the ſtricture had been removed by cauſtic. This, however, cannot be called a failure of the cauſtic. It only ſhews that gout can affect ſtrictures, and re-produce them.

"In ſome patients the ſtrictures are ſo *obdurate*, that the uſe of the cauſtic is neceſſary to be continued for a longer time than the parts can bear its application, or even that of the bougie paſſing along the urethra; irritation therefore comes on and ſtops the progreſs of the cure, and when the ſame means are reſorted to again, the ſame thing takes place. The caſes of failure of this kind that I have met with, ſome of which may yet ultimately be cured, if the patients will take the neceſſary ſteps for that purpoſe, amount in all to ſix.

"In ſome patients the ſtricture is readily removed by the cauſtic, but in a few weeks contracts again. The ſtricture being wholly ſpaſmodic, the cauſtic, by taking off the ſpaſm, is allowed to paſs through, and cannot completely deſtroy the ſtricture. Of this kind I have met with one inſtance, which I muſt conſider as a failure, as I have hitherto been unable to get the better of it.

"In thoſe caſes where the cauſtic gradually removes the ſtricture, and brings the urethra to a ſize that allows the patient to make water perfectly well, if there is any return, it is not to be attributed to the failure of the cauſtic, but to the want of proper management, either from the cauſtic being too ſmall, or its uſe left off too ſoon; but all ſuch caſes are, I believe, within the power of being cured by the cauſtic, if its uſe is recurred to when that is found neceſſary."

Mr. Home's caſes, illuſtrating the application of the cauſtic to ſtrictures, under different circumſtances, are introduced with upwards of twenty *common inſtances*, in which this treatment ſucceeded perfectly. Of theſe the following will ſuffice.

Case IV. "A gentleman who had reſided ten or eleven years at Bombay, returned to England with a ſtricture in the urethra, which had been coming on for ſeveral years before he left India. The ſurgeon, under whoſe direction he placed himſelf, conceived the idea of overcoming the ſtricture by preſſure, and inſtead of the bougie, paſſed a catheter down to the ſtricture, and made uſe of ſome force in preſſing againſt it. This mode of treatment brought on irritation, gave pain, and did not after ſome time afford any proſpect of a cure. Having heard that the uſe of the cauſtic had proved more ſuccefsful, the gentleman put himſelf under my care.

"The ſtricture was ſituated near the bulb of the urethra: I had, therefore," ſays Mr. Home, "every reaſon to ſuppoſe there was only one, to which I applied the cauſtic in Nov. 1794. After it had been twice uſed, a full-ſized bougie paſſed through, but did not go into the bladder. I ſuſpected now that the proſtate gland might be diſeaſed; but found upon examination that was not the caſe, and this ſecond obſtruction proved to be another ſtricture, which it is highly probable was the original. I applied the cauſtic to this ſecond ſtricture five times before a middling-ſized bougie could be paſſed, and this by no means with eaſe; the urethra was beginning to become irritable, and the weather was intenſely cold; theſe were circumſtances peculiarly unfavourable to his conſtitution, which even in India had been affected by the cold ſeaſon of that climate, and was much more ſo by the winter here. Having relieved the immediate ſymptoms, I wiſhed him to remain quiet, and only to paſs a bougie for a few minutes daily for ſome little time, till we ſhould ſee what would be the effects of a change in the weather, upon the local as well as the conſtitutional irritability; and if the complaint was not removed under theſe circumſtances, it would be neceſſary to return to the cauſtic.

"Nothing was done for ſix months; in which time the ſymptoms, inſtead of being leſſened, were a good deal increaſed; and the cauſtic was again reſorted to. In returning to it, the ſecond ſtricture only required to be removed; the firſt, which had been completely deſtroyed, not having returned. The firſt time the cauſtic was applied it gave little pain; but the ſecond time the parts were all diſpoſed to contract, and I propoſed that twenty drops of the tincture of opium ſhould be taken, to diminiſh this degree of irritability, before it was again applied. This medicine had the deſired effect; for the parts were in a much more relaxed ſtate, and a middle-ſized bougie was admitted into the bladder. This, however, was not conſidered as ſufficient, and the application of the cauſtic was continued for ten or twelve times; nor after all could a full-ſized bougie be paſſed, the canal at this part not being enlarged to the ſame width as the reſt of the paſſage.

"Finding that nothing more at preſent could be done, in Auguſt, 1795, he went to the ſea, and found his general health much improved by bathing; but the ſtrictures were diſpoſed to contract, and every four or five days he found it neceſſary to paſs a bougie down to the laſt ſtricture, but he did not get through it, and if this was neglected the other began to loſe ground. He went on in this way till January, 1796, when he came back to town and put himſelf again under my care; and as the weather was uncommonly mild, it was agreed to try the cauſtic, and ſee whether it now could be perſevered in ſo as to deſtroy this laſt ſtricture, which had hitherto baffled all our efforts. The firſt applications brought on a degree of ſpaſmodic action of the parts as before, but this was prevented by opiates; after ten or twelve applications without the ſmalleſt progreſs, the end of the unarmed bougie was impreſſed by the ſtricture on one ſide only. This being obſerved, the cauſtic was oppoſed exactly to that part, it was made larger and longer, and after remaining about two minutes the ſtricture gave way, attended with a ſmart pain, and was followed by a conſiderable hæmorrhage, and a great deal of pain; but wholly confined to the part, not extending along the canal to the glans penis as it uſed to do: the ſtream of urine was found to be larger than before. A ſecond application made in the ſame way effectually removed this obſtruction; the bleeding and pain continued ſeveral days, after which a diſcharge came on, and they abated, and there was now a total abſence of the irritation, which before had always been felt in thoſe parts.

"This however did not prove to be the laſt ſtricture, there was another three fourths of an inch further on. This ſtricture had a larger cauſtic applied to it than is uſually employed, and after five applications little was gained, but no irritation was produced; and the ſeventh effectually removed it, and a common-ſized bougie paſſed into the bladder. In deſtroying this laſt ſtricture, there was neither hæmorrhage nor irritation as in the others.

"In this caſe the ſtrictures were very difficult of removal, the cauſtic having been very often applied, and the time required was longer than in any caſe that I have hitherto met with. This perſeverance was however in the end ſucceſsful."

From four *caſes of ſtricture attended with gleet*, which ceaſed when the ſtricture was removed by the cauſtic we ſelect the foling:

Case V. "A gentleman aged twenty-five, in January, 1792, contracted a gonorrhœa, which was ſo violent, from the degree of inflammation, phimoſis, chordee, and pain in making water, that he was not able to uſe an injection till the month of April; he then uſed, by the advice of his ſurgeon, a ſtrong injection of calomel, ſugar of lead, and roſe-water; this about the middle of May removed the inflammatory ſymptoms, and leſſened the diſcharge, but after coition, hard drinking, or hunting, it was liable to return in conſiderable quantity. He bathed and took bark all the ſummer and autumn, but to no effect. In June, 1793, he had a very violent diſcharge, without any one inflammatory ſymptom; for which he uſed a vitriolic injection, compoſed of ſixteen grains of white vitriol, and ſix ounces of elder flower water, mixed up with a little gum-arabic, which he injected every hour in the day, for three weeks; this ſtopped the diſcharge, except that when he committed any exceſs, it was liable to return. In May, 1794, the diſcharge became very great, without the leaſt inflammation; the ſame vitriolic injection was uſed as before, and the diſcharge again diminiſhed; he then took large doſes of bark, and balſam of Tolu, copaiva, and Canada balſam; he alſo bathed all the ſummer, but the diſcharge never diſappeared for more than a month at a time.—While he was hunting in the October following, he leaped over a five-foot wall, into a gravel-pit, which brought on a ſwelled teſticle, inflammation of the ſpermatic chord, and a pain in the back, alſo a pain in the perinæum. The ſwelled teſticle was cured by cold applications; but he did not venture to hunt till January, 1795. A ſmall diſcharge now and then appearing, his ſurgeon introduced a bougie, and ſaid he had a ſtricture; but after a courſe of bougies for three weeks, he told him he was perfectly well. The diſcharge returned in May, 1795. He came over to London, and put himſelf under the care of a ſurgeon, who gave him an injection, which ſtopped the diſcharge in ſix weeks; he was, however, ſubject to a return every two months, but the injection always ſtopped it again in a few days. In May, 1796, he had a copious diſcharge, without inflammation, which was treated as a gonorrhœa, till about the 12th of June, when, on paſſing a bougie, the ſurgeon found a ſtricture, and kept him under a conſtant courſe of bougies, wearing them for twelve or fifteen hours a-day, till July 21ſt. The bougies were never introduced beyond ſix inches and a half down the urethra. July 21ſt, he had evident ſymptoms of a ſwelling in the ſame teſticle which was affected in 1794. He uſed conſtant applications of goulard, which allayed theſe ſymptoms in three days. He then uſed bougies again, gradually increaſing the length of their application, till he again uſed them from twelve to fifteen hours a-day, till the 12th of Auguſt; from that time he diminiſhed the period of their application till the 22d, when, though he had a conſiderable diſcharge, the ſurgeon ſaid that he was perfectly well of the ſtricture, that he need not fear its return; and that bathing, with the uſe of the injection before employed, would remove the diſcharge in a very few weeks. On the 24th of Auguſt he went to the ſea, and bathed every ſecond day till the 21ſt of September, without benefit. This induced him to return to London on Friday, September 23d, and put himſelf under my care.

"I found a ſtricture," ſays Mr. Home, "and recommended the uſe of the cauſtic, to which he readily agreed, and it was immediately applied, and repeated every other day, without giving any violent pain, or producing inflammation. On the ſecond of October the firſt ſtricture was removed, and the cauſtic applied to another at 6½ inches; this created unpleaſant ſenſations about the bladder, ſo that it was neceſſary to quiet the parts by ſpirituous applications, and to give opiate medicines. Under this treatment he was well enough to bear another application of the cauſtic on the 5th, again on the 7th, and on the 9th, when the bougie went with eaſe into the bladder; on the 11th this was repeated, and the cauſtic paſſed through the ſtricture, after which it was left off. There was a good deal of bloody diſcharge for ſome days; on the 17th the diſcharge was leſs bloody, and leſs in quantity. A fortnight after, the diſcharge was nearly gone; a month from the laſt application of the cauſtic, the bougie paſſed with eaſe into the bladder. The diſcharge ceaſed; and I have heard from him, many months after his leaving town, and there has been no return of diſcharge, or any other ſymptom."

The next caſes related are thoſe of *Stricture with a thickening in the canal*, that forms a ſwelling. In theſe the latter ſubſided when the ſtricture was removed by the cauſtic.

Mr. Home ſays, "This tumor, when it occurs in that particular part of the canal, I conceive to ariſe from one of the lacunæ of the urethra being cloſe to the ſtricture, the coats of which have been inflamed, and remain in a thickened ſtate.

"My reaſons for adopting this opinion are, that in four caſes in which I have met with it, the ſituation in the canal has been the ſame, and in a part of the urethra where a lacuna is naturally ſituated. The tumor in all of them was on the lower ſide of the urethra. I have alſo met with ſimilar ſwellings in conſequence of the uſe of injections in caſes of gonorrhœa, in warm climates; they were in the ſame part of the canal, and gradually ſubſided when the inflammatory ſymptoms went off.

"It appears that this ſwelling, from whatever cauſe it ariſes, ſubſides after the ſtricture is deſtroyed by the cauſtic. Such ſwellings, therefore, inſtead of being an objection to the uſe of the cauſtic, are reaſons for employing it.

"Theſe tumors may ariſe from a thickening of the parts ſimply; for I have met with a tumor of this kind in the perinæum, which I ſuſpected to be a ſmall ſtone lodged there, but it was entirely deſtroyed by the uſe of the cauſtic."

Case VI. "A gentleman, aged about thirty-five, had for ſeveral years a difficulty in making water, and had been very often ſeized with a complete ſtoppage of urine. He had given bougies ſeveral trials, and ſuffered all the inconveniences they produce; he had even been confined for ſix months at a time to give them every advantage; but was unable at laſt to paſs one larger than a knitting needle, and that did not go on to the bladder.

"Under theſe circumſtances he put himſelf under my care, in March, 1796. There was a ſtricture about two inches from the orifice: this was with very great difficulty removed, requiring ten or twelve applications of the cauſtic; a ſecond was met about four inches, and at this part there was a tumor, which could be felt externally, the ſize of a large pea. After getting through this, which required a great many applications, I was unable for a long while to enlarge the canal at this part beyond a certain ſize, but by increaſing the diameter of the cauſtic, which was allowed in one application entirely to diſſolve there, the tumor began to diminiſh in ſize, and in three months from his being firſt under my care, during which time the cauſtic was applied to it forty times, it was almoſt entirely gone. During this time he had ſeveral attacks of inflammation of the throat; theſe were ſuſpected by ſome of his medical friends to be venereal. But I requeſted him not to uſe mercury, and they went off without any particular means being uſed for that purpoſe.

"A bougie now paſſed into the bladder, and I left the parts to themſelves; but a week after, on attempting to paſs a bougie, I found a ſtricture at ſix inches, which from its connection with the other, had been relaxed, but afterwards contracted again. The cauſtic was applied to this ſtricture ſeveral different times, and when the bougie got beyond it, there was the feel of a hard ſubſtance, which made me ſuſpect a ſmall calculous concretion was lodged behind it, keeping up a degree of irritation in the canal; this, however was not the caſe.

"As ſoon as I was able to paſs a bougie freely into the bladder, I endeavoured to introduce a flexible gum catheter, but could not ſucceed. By perſevering with the cauſtic two or three times more, I was able to paſs a catheter, and in a future trial got the patient to do it himſelf, which I recommended him to practiſe, with the view of promoting abſorption in the thickened parts by its preſſure while lying in the canal.

"The paſſing a flexible gum catheter, and leaving it in the bladder, at firſt view appears a more harſh application, and more liable to irritate than a bougie; it may therefore be objected, that I condemn the mild application of a bougie, while in particular caſes I recommend a harder one: but the advantage of the catheter is, that the bladder can be emptied by it whenever there is the ſlighteſt irritation. This it takes off, and leaves the parts in an eaſy ſtate, which is not the caſe with a bougie. It will be found in ſeveral of theſe caſes that experience is in favour of the catheter; the ſame urethra which could not bear a bougie for half an hour, will allow the catheter to remain for many hours without the ſmalleſt inconvenience.

"The gentleman who is the ſubject of this caſe had had no return of his complaints a year after he left me, and the diſpoſition to ulceration in the throat has been entirely removed; ſo that it is highly probable the former attacks were brought on by the action of the cauſtic on the ſtricture, irritating the conſtitution, and inducing that complaint. I have met with another inſtance of ſtricture, where a ſimilar affection of the throat came on while the cauſtic was uſed, it returned ſeveral different times: but as I attributed it to the effects of the cauſtic, it gave no alarm, and always went away under the moſt ſimple modes of treatment."

Of the effect of the cauſtic in thoſe *caſes of ſtricture which are complicated with fiſtulous* openings in the perinæum the following is an inſtance:

CASE VII. "A gentleman, aged twenty-three, in the beginning of the year 1769 was attacked with a violent gonorrhœa, attended with heat of urine and violent chordee, which continued without relaxation for twelve weeks. At the end of about ſix months the ſtream of urine leſſened, and as there was reaſon to ſuſpect the formation of ſtricture in the urethra, a bougie was introduced, and he was deſired to let it remain for ſome time; but from the great irritation it occaſioned, he could not bear it more than a few minutes. On withdrawing it the urine flowed more freely, but not with leſs pain. From this time the bougie was paſſed once every twenty-four hours, for ſome months, when a ſuppreſſion of urine took place, and not a drop could flow till the paſſage was forced by a bougie; he was now obliged to paſs one every time he made water.

"About the year 1774 he was recommended to apply to Mr. Hales, who, on paſſing a bougie, aſſured him he would effect a cure, and gave him ſome bougies for that purpoſe; theſe he uſed for a conſiderable time, without any benefit.

"In the year 1778 the ſtricture became more contracted, and the painful ſymptoms increaſing, attended with a teneſmus, he applied to Mr. Hunter; who, after examining the proſtate gland, declared his cure to be in his own power. This aſſertion induced him to put himſelf under Mr. Hunter's care, who made uſe of the lunar cauſtic, paſſed through a canula, to a ſtricture at 6½ inches from the external orifice; but no material benefit being obtained after applying it twenty-one times, he gave it up, and recommended the uſe of the bougie as before. About the year 1784, the paſſage was ſo much contracted, as not to admit the ſmalleſt bougie, and no urine flowed for more than forty-eight hours, notwithſtanding the common and approved remedies of the warm bath and opium were made uſe of. Of tincture of opium, one hundred and twenty drops were given in twenty-four hours. When nearly all hopes were at an end, by good fortune a ſmall catgut bougie found the aperture, and the urine followed; after this a great diſcharge of brown coloured mucus paſſed from the bladder with the urine, attended with an aching pain and frequent ſolicitations to make water. The mucus was equal in quantity with the urine, and gave it a pungent volatile ſmell. The bougie could now paſs as before; the mucus gradually diminiſhed in quantity, and in about ten days diſappeared. This ſymptom has attended the going off of every paroxyſm of the complaint.

" About the year 1789, he applied to Mr. Pott, who recommended him to be ſatisfied with paſſing the bougie, and told him that he never knew any relief obtained by the uſe of the cauſtic.

" The complaint increaſing, and the total ſuppreſſion of urine becoming frequent, about 1791 he deſired his caſe might be ſent to a ſurgeon in London, who, after due conſideration, ſent him ſome bougies, armed by having nearly an inch of their points covered with powdered lunar cauſtic, which he deſired might be paſſed through a canula (ſent for that purpoſe) into the ſtricture; this was done without much benefit. In April, 1795, he was again attacked by a ſuppreſſion of urine, attended with a violent ſtrangury, ſymptomatic fever, loſs of appetite, and continual nauſea, by which he was confined to his bed for three weeks: this was followed by a ſwelling of the left teſticle, and a conſiderable enlargement of the epididimis. Theſe ſymptoms abated in the uſual way, by a great diſcharge of mucus from the urethra and bladder, and alſo by a diſcharge of a conſiderable quantity of opake, white, gritty matter. In June, 1795, he was attacked with a moſt violent pain in his back, which confined him almoſt conſtantly to his bed for three months; for this ſymptom he was adviſed the uſe of the warm bath, electricity, bark, &c. but without effect. In January, 1796, he was attacked with a ſwelling near the rectum, occaſioned by the urine eſcaping into the cellular membrane every time he made water; this ſwelling increaſed, with a violent ſmarting pain, and by degrees it extended along the perinæum as far as the ſcrotum; at the end of a fortnight it burſt, and diſcharged near twelve ounces of pus, of an urinous fœtid ſmell; he was reduced by this attack to ſuch a ſtate of debility, as to faint on being taken out of bed. The burſting of the tumor left an opening, through which, every time he made water, ſome part of the urine eſcaped, with a violent ſmarting pain. As ſoon as his ſtrength was ſufficiently reſtored to bear the motion of a carriage, he came to London, which was in the beginning of May, 1796, and immediately applied to me.

" As during the complaint, bougies had been paſſed more than twenty thouſand times, he had long been of opinion, that no permanent relief was to be expected, but from the ſubſtance being deſtroyed, either by the knife or the cauſtic. At this time the general ſymptoms were, a continued gleet, pain in making water, and, for ſome time after, frequent and copious diſcharges of matter, chordee, and every ſenſation that attends a freſh-contracted virulent gonorrhœa.

"Upon examining the urethra," ſays Mr. Home, "by paſſing a bougie as large as the external orifice would admit, I found a ſtricture at five inches, and told the patient that the firſt thing to be done was to remove that obſtruction; he told me that none of his former ſurgeons had found any ſtricture there, nor had they thought it neceſſary to attempt any thing at this part: that circumſtance alone, I ſtated to him, was the cauſe of their failure: for he muſt recollect perfectly, that after the cauſtic or bougie in former trials had been uſed for any number of times, a contraction always came on at this part, and prevented him from perſevering in their uſe; and therefore although the ſtricture was ſlight, it was neceſſary it ſhould be removed. He aſſented to the truth of my remark, and readily ſubmitted to my conducting the cure in the way I thought beſt adapted for that purpoſe.

"I applied the cauſtic to the ſtricture at five inches, which after four or five applications was removed. The bougie now paſſed down to the original ſtricture; to this the cauſtic was uſed for ſeveral weeks, the pain in the application was ſevere, and he was obliged to paſs a ſmall bougie at the time of making water as before. The fiſtula became very troubleſome. Theſe ſymptoms however gradually abated, and the pain from the cauſtic, after ſome time, hardly deſerved that name; by the middle of July the uſe of the ſmall bougie became unneceſſary, and the call to make water was leſs frequent; only three times in the night.

"On the 25th the fiſtula was healed up, and the conſtant uneaſineſs in perinæo removed. The cauſtic was uſed in September every day for three weeks, and apparently with advantage, but the ſmalleſt bougie did not go into the bladder. September 24th, the fiſtula broke out, in conſequence of the formation of a freſh abſceſs; on the 30th a ſilver ſound paſſed into the bladder, and after it got beyond the part to which the cauſtic was applied, met no difficulty. The cauſtic when applied every day, gave more pain; ſo that after a few applications it was only uſed on the alternate days, and then again for a few times every day. October 17th the end of the bougie was more diſtinctly marked by the ſtricture. By Chriſtmas the ſilver inſtrument was more readily got into the bladder; the irregularities behind the ſtricture preventing ſo weak an inſtrument as the bougie to paſs over them. He now made water very well, and all his former ſymptoms were removed. He went into the country, and was to paſs, once every two or three days, the ſilver ſound into the bladder, to keep the parts in their preſent ſtate. I have heard of him ſix months ſince he left town, and underſtand that he continues free from complaint."

The next ſubject offered to the reader's attention by Mr. Home, is that of *ſtricture with uncommon irritations*, which went off on the removal of the cauſe.

"In many caſes of ſtricture," ſays he, "irritation takes place in the urethra when the parts are thrown into ſtrong action, as in the coitus. This produces pain, and brings on ſpaſm. An effect not very diſſimilar, is in ſome inſtances produced by paſſing a bougie over the parts immediately after a ſtricture has been removed, the tender ſurface is irritated, and the effects extend to the bladder: theſe however go off, and are not afterwards met with.

"In the firſt caſe, the ſpaſm is removed by the cauſtic, and in the other, it is an accidental violence which goes off of itſelf, as will appear from the following caſes:

"There is in the minds of many ſurgeons, and almoſt all patients, ſuch a dread of inflammation on the bladder, that when any ſymptoms of irritation attacks that viſcus all means of preventing or removing inflammation are immediately had recourſe to, and the ready abatement of the ſymptoms under their treatment, although they would have ſubſided of themſelves, is attributed to the means made uſe of, which encourages the practitioners to purſue the ſame plan in ſimilar caſes."

The laſt of the caſes related by Mr. Home will illuſtrate theſe circumſtances very ſufficiently:

Case VIII. "A gentleman, aged thirty, about ſeven years ſince had a venereal gonorrhœa; he immediately uſed an injection, and in about a week, (as he had no diſagreeable ſenſations, and no diſcharge) he concluded himſelf well, and therefore left off the injection; in about three days, however, the running returned with conſiderable violence: he then applied to a phyſician, who ordered him to drink whey in great quantities, and to take gum-arabic and nitre. The ſcalding and running rather increaſed under this treatment; he therefore, in about ſix weeks, applied to a ſurgeon, who began by giving mercurial pills and gentle purges; but not finding theſe to anſwer, gave balſam copaiva, elixir of vitriol, and an injection.

"At the end of a month, he found a difficulty in making water, upon which the ſurgeon paſſed a bougie of about 4 inches in length, which met with ſome obſtruction; he adviſed him to continue the bougie in the urethra the whole of that day, and repeat it for about four or five hours the next day; and in about three or four days he directed him to wear the bougie the whole day. After wearing it for a month, the ſurgeon ſaid the ſtricture muſt certainly be removed, and the bougie was left off. Bathing was afterwards directed for the cure of the diſcharge, which ſtill continued as bad in colour, and as much in quantity, as ever.

"In a week the running and ſcalding became ſo diſagreeable, that he determined to apply to another ſurgeon: this gentleman adviſed taking larger doſes of copaiva and elixir of vitriol than before, but this was of no ſervice; he afterwards took hemlock pills, but with no effect. He attempted ſea-bathing, but this diſagreeing with him he left it off. The running and ſcalding, after he had been ſome little time at the ſea, ſeemed rather to abate. He had during this period frequent connection with women. After he had been at the ſea about ſix months, he felt more diſagreeable ſenſations in the urethra than uſual, and the running ſo much increaſed that he concluded himſelf again infected, and made uſe of an injection of ſugar of lead and roſe-water; this was of ſo little ſervice that he determined to go to London. He was then put under a courſe of bougies: he began by uſing one five minutes at a time, and increaſed it. After wearing the bougie twice, one of the teſticles gave pain in the morning, and before night it ſwelled conſiderably; the ſwelling and pain did not leave him for more than a month. He made water freely during that month; but after the ſwelling had almoſt ſubſided, and he was ſufficiently well to go out, he found at times a good deal of difficulty in making water. He paſſed a bougie when this happened, and then the urine came forward very well; the bougie was at ſome times a good deal more obſtructed than at others. Once he was a great deal alarmed at not being able to paſs it at all. He was ordered to go to bed, and to take a decoction of marſh-mallows; he made water tolerably well before morning. It was now ſuppoſed that the complaint in his urethra proceeded from ſpaſm. A bougie was paſſed repeatedly to aſcertain this point, of which he at length thought there was no doubt. It was now wiſhed to have Mr. Hunter's opinion. Mr. Hunter paſſed a bougie, and after it was withdrawn, ſaid that there were three ſtrictures in the urethra, but from the account concluded they were ſpaſmodic. Mr. Hunter recommended, therefore, that he ſhould always be provided with bougies, for the purpoſe of paſſing them when he had any difficulty in making water; he alſo adviſed the patient to take the extract of hemlock. The running ſtill continued the ſame in quantity and colour: he took the hemlock, and entirely left off wine. Scarce a day paſſed without his being obliged to make uſe of the bougie, to enable him to make water. He perceived at times, that different parts of the urethra obſtructed the bougie; at others, a moderate-ſized bougie went into the bladder with ſcarce any obſtruction. While he remained in London he had frequent nocturnal emiſſions, which commonly awoke him: the ſemen was always diſcharged.

" After he had been ſome time in the country, he was much alarmed by having been awakened by ſuch an irritation, without any emiſſion. He had connection with a woman, and took means to aſcertain exactly whether this would conſtantly be the caſe, and found that the ſame thing happened five or ſix times afterwards. The ſeventh time he had connection with a woman, in the ſame manner, the ſemen came forward, but in very ſmall quantity. He now made uſe of exercise on horſeback (which he had before left off); but did not find any alteration. The ſymptoms at this time were exactly theſe: a diſcharge from the urethra, ſimilar to that from a gonorrhœa, attended with ſome drops of blood, which generally followed the urine; a ſmall degree of uneaſineſs in one of the teſticles; the ſemen ſeldom coming forward in the action of the coitus, and then in ſmall quantities; a neceſſity of making uſe of the bougie, to relieve a ſuppreſſion of urine, ſometimes once, ſometimes oftener, in the courſe of the twenty-four hours. Notwithſtanding theſe circumſtances, he continued in his general health as well as he had been before he had the complaint. In about eight months he returned to the uſe of wine, which made no alteration whatever in the complaint for the worſe; it continued without any variation till about the 7th of October, 1795. He had been in the country ſhooting the whole of September, and felt one morning when he was out a conſtant deſire to make water, with a good deal of uneaſineſs in the bladder, which obliged him to return home and go to bed; he took an opiate draught, and had bladders of warm water applied to the perinæum.

" He felt a good deal of pain in the bladder after making water, and alſo in the back and kidneys; the whole of this time, the water came in a full ſtream. He continued in a good deal of pain for about ten days, after which it abated.

" A ſurgeon paſſed a bougie, and told him that he had one permanent ſtricture in the urethra, which was the cauſe of his complaints; he adviſed, as his teſticle had been ſwelled before, that he ſhould uſe the warm bath at the ſame time with the bougies; that he ſhould paſs the bougie, not into the bladder, but a little beyond the ſtricture: the pain in the bladder and kidneys gradually ſubſided.

" He then required the occaſional uſe of the bougie (which he had not done while the pain continued) in order to make water. He now took exerciſe as uſual, determining to put off the paſſing a bougie for the preſent. He did not commence wearing the bougie till May, and did not go into the warm bath. He increaſed the time of wearing it to about two hours in the morning, and the ſame at night. He continued this plan till January; the ſemen now almoſt always came forwards, but not in the uſual quantity. He had connection with a woman, and in about four days had a diſcharge attended with a good deal of irritation in the bladder.

" Under theſe circumſtances," ſays Mr. Home, " he put himſelf under my care. Upon examining the urethra, a ſtricture was found, at about five inches.

" The cauſtic was applied while there was a very great diſcharge, much irritation and tenderneſs. The pain of the cauſtic did not increaſe the irritation, or bring on affection of the teſtes, or any other unpleaſant ſymptom. The diſcharge diminiſhed conſiderably, even under the uſe of the cauſtic. After applying the cauſtic twice to the firſt ſtricture, and five times to one at ſix inches, the bougie went into the bladder, and afterwards a bougie the full ſize of the canal paſſed without difficulty, but gave a great deal of pain, and brought on a paroxyſm of fever, which went off: next day the diſcharge increaſed; but diſappeared in a few days.

"The ſemen now came forward in the full quantity, and all the former irritations ſubſided; nor did they return in the courſe of the time when I had an opportunity of ſeeing him, which was for ſeveral months after his recovery."

The caſes of *ſtricture attended with uncommon conſtitutional affection, and of ſtricture connected with other diſeaſes*, are too various for ſelection, and would be injured by abridgment; for which reaſon we refer the reader to Mr. Home's work, in which he will alſo find much general and truly valuable information on the ſubject of ſtrictures.

CHAP. XXXII. DISEASES ABOUT THE ANUS.

SECT. I. *Of* HÆMORRHOIDS *or* PILES.

The diſeaſe called hæmorrhoids, or piles, has been already conſidered under the head of MEDICINE; but it ſometimes happens, that although the means mentioned there have been employed, the diſeaſe becomes ſo violent as to require the aſſiſtance of the ſurgeon. Where the diſcharge of blood is ſo great as to endanger the life of the patient, we ought to attempt to ſtop it either by compreſſion, or by ſecuring the bleeding veſſels by a ligature; and here the tenaculum is preferable to the needle, becauſe, when the latter is uſed, a portion of the rectum is apt to be included in the ligature. When piles are arrived at ſuch a ſize as to obſtruct the paſſage of the fæces, or to produce great irritation, the removal of them becomes neceſſary. The manner of doing this moſt conveniently, together with ſome obſervations on the general treatment of this complaint, have been publiſhed by Mr. Ware, in his volume of Surgical Eſſays.

"When the remedies," ſays Mr. Ware, "that have been mentioned, have been tried without ſucceſs,—when the patient is diſabled from purſuing his uſual occupation,—and the pain which the hæmorrhoids occaſion is both violent in degree and frequent in returning,—it becomes indiſpenſably neceſſary to have recourſe to other means of affording aſſiſtance; and the only ones I recollect, that have been propoſed by authors ſince the uſe of the cautery and cauſtics has been relinquiſhed, are—the operations of extirpating the whole of them;—either by cutting them off with a ſcalpel or ſciſſars,—or by tying a tight ligature round their baſis, in order to deprive them of nouriſhment, and thus to cauſe them to die and fall off. Theſe operations, though leſs dreadful than thoſe that are relinquiſhed, are ſtill formidable in no ſmall degree. The former, if the tumors are large, makes a wound of conſiderable extent, and riſques a hæmorrhage, which has ſometimes been very difficult to ſuppreſs; and the latter brings on a ſevere pain, which has continued many days, before the portions that are included within the ligatures have ſeparated and come away.

"Before recourſe is had to either of theſe operations it may be of uſe to recollect, that though the number of hæmorrhoidal tumors protruded through the anus is often conſiderable, yet the pain which the patient ſuffers is not produced equally by all of theſe. If an accurate enquiry be made, I believe, it will be found that the patient will point to one, or at moſt to two, of the tumors, from whence all his pain proceeds. When theſe are examined, it will be diſcovered that they are much harder and more inflamed than the reſt; and generally they are alſo ſmaller and leſs prominent; protruding but juſt low enough to be compreſſed by the ſphincter ani.

"If this be a juſt deſcription of the ſtate of the diſorder, it follows, that the operations I have mentioned, as being in common uſe for its cure, when more eaſy means have failed of effecting it, viz. that of cutting off the whole number of hæmorrhoids with a ſcalpel or ſciſſars, and that of tying a ligature round them, in order to cauſe them to die and fall off, are both alike unneceſſary. Inſtead of having recourſe to theſe ſevere remedies, *we have only to direct our attention to the hard inflamed tumor*, which is the cauſe of the pain, and which is not unfrequently ſituated in the *centre* of the reſt. This is often no larger than the end of the little finger, and the removal of it almoſt inſtantly abates the pain, and, in a ſhort time, cauſes the reſt of the tumors to collapſe and diſappear. The mode in which I have performed the operation in a great variety of caſes, with perfect ſucceſs, is ſimply this. Having ſecured the little hard tumor, which, as above mentioned, is often ſituated near the centre of the reſt, and much darker coloured than they are, with a common diſſecting hook, or forceps, I ſnip it off as cloſe to its baſis as poſſible, with a ſharp pair of curved ſciſſars. The pain which the operation occaſions is really trifling; and the hæmorrhage which follows is ſo ſlight, that I have rarely had occaſion to uſe any application to check it. If the hæmorrhoids are conſtantly protruded, the operation may be performed at any time; but if they only appear after the fæces are voided, that opportunity muſt be choſen for this purpoſe.

"In thoſe caſes where the pain produced by hæmorrhoids has not been violent, but where there is a conſtant diſtreſſing uneaſineſs, with frequent returns of a profuſe hæmorrhage (which hæmorrhage ſometimes debilitates the patient to ſo great a degree that his ſtrength is nearly exhauſted), an operation ſimilar to that I have deſcribed will not unfrequently be ſufficient, in an eaſy manner, to effect a radical cure of the diſorder. In caſes of this deſcription, as well as in thoſe before mentioned, a careful enquiry will often diſcover, that *one*, or at moſt *two* of the hæmorrhoids are alone productive of theſe effects, and alone require to be removed; the excitement and protruſion of the reſt being merely the effect of the irritability which theſe occaſion.

"The procidentia ani which accompanies hæmorrhoids uſually ceaſes as ſoon as this diſorder is cured. It ſometimes takes place alſo from mere weakneſs in the inteſtinum rectum. Thoſe who are old are particularly ſubject to this procidentia; but it happens occaſionally to perſons of all ages. A very large portion of the rectum is ſometimes protruded in infants; and if it be ſuffered to remain long in this unnatural poſition, it is liable to become much inflamed, and even gangrenous. When a ſurgeon is called to a caſe of this kind, no time ſhould be loſt, but the gut be returned to its proper poſition, as ſoon as poſſible, by the gentle and gradual preſſure of the fingers; after which a thick compreſs, ſo graduated in ſize as to adapt itſelf to the ſpace between the nates, and ſteeped either in red wine, or in ſome aſtringent lotion, ſhould be bound on the part with a T bandage, to hinder the gut from again protruding. When a bandage has been applied for the above purpoſe, the patient ſhould be gentle in all his movements; ſince a ſudden change of poſture is apt to vary the degree of preſſure that the bandage makes, and to allow the bowel again to protrude; in which caſe the preſſure of the bandage on the tender gut has been found to do harm rather than ſervice. In ſome inſtances of the procidentia ani, the patients have been ſerved by introducing into the rectum, morning and evening, a tent about two inches long, and as thick as the little finger, made of a candle or of ſome ſtiff cerate. So long as a tent of this kind preſerves its conſiſtency, it compreſſes the ſides of the gut and hinders it from coming down; but when it is melted by the heat of the part it loſes its efficacy; and therefore the application of the compreſs and bandage above deſcribed is neceſſary, at the ſame time that the tent is uſed, in order to aſſiſt its action. The internal adminiſtration of the medicine known by the name of *Ward's paſte* (No. 207, page 228, of vol. II.) has alſo in ſome inſtances of procidentia been found uſeful to ſtrengthen the debilitated inteſtine.

"If the procidentia has been of long continuance, it muſt be confeſſed, after all, that none of theſe means can be depended upon, as affording a certain ſecurity againſt the return of the diſorder, not only after a coſtive ſtool, but on any quick or ſudden motion of the body. In all theſe caſes, it is the duty of the ſurgeon very accurately to examine the ſtate of the protruded part; ſince, in ſome it has been found that a ſmall portion of the gut has been evidently more tumified than the reſt, and more tender when touched with the finger; the removal of which tumified part, in the way I have recommended common hæmorrhoids to be removed in the preceding pages, has occaſioned the remainder to collapſe, and the patient to become quite well."

We are particularly diſpoſed to agree with Mr. Ware in the following objections to the removal of hæmorrhoids by the ligature. He ſays,

"Former authors, and particularly Mr. Benjamin Bell of Edinburgh, ſeem to leave it, as a matter of indifference, whether hæmorrhoids be cut off or tied off. The violent pain which the operation of tying them occaſions, and the continuance of this pain for two or three days together, are objections to the uſe of the ligature, which, in my own mind, I have never been able to overcome. At the ſame time the danger that is liable to ariſe from a profuſe hæmorrhage, after cutting off ſo large a number of hæmorrhoids as often protrudes in this diſorder, is with many an objection of no ſmall weight againſt the old mode of exciſion; although I believe this hæmorrhage may always be hindered from becoming ſeriouſly troubleſome, if a due attention be paid to keep the patient cool, and to avoid hot liquors for the firſt day or two after the operation has been performed." Whether the danger be greater or leſs, it cannot but be conſiderably diminiſhed by the alteration in the mode of operating which Mr. Ware has ſuggeſted.

With regard to the treatment after the operation, he ſays, "a thick compreſs ſhould be applied, wet either with cold brandy and water, or with a cold ſaturnine lotion; retaining it on the part with the uſual T bandage. The patient ſhould be directed to keep perfectly ſtill; to lie rather cooler than uſual in bed; and to take nothing, in the way of diet, that is either hot or ſtrong. I remember only two inſtances," ſays Mr. Ware, "in a conſiderable number of this kind, in which further attentions were found neceſſary. In neither of theſe did any ill conſequences follow, except the alarm from an hæmorrhage, which was quickly ſuppreſſed: and the hiſtory of one of them is given in the ſixth caſe that will be found annexed to theſe remarks.

Case I. "A gentleman in Birchin-lane applied to me, about three years ago, on account of an hæmorrhoidal diſorder to which he had been ſubject many years. For the laſt twelve months ſeveral large tumors were protruded through the ſphincter ani whenever he had a ſtool, and afterwards they not only bled, but he was often for hours in ſo much pain, that he was unable to attend to any buſineſs. Many medicines had been given him, and different applications employed, but without affording him any aſſiſtance.

On an examination, I found a conſiderable number of hæmorrhoids protruded through the anus, all of which appeared to be in a ſtate of inflammation; but one in particular was exceſſively tender, and felt quite hard when touched with the finger *. I ſtated to the patient my opinion, that this hard pile was the cauſe of the pain he endured, and that the removal of it was a highly probable means of giving him eaſe, and cauſing the other tumors to collapſe. On the ſubſequent day I performed the operation in the following manner: Having ſecured the hard hæmorrhoid with a diſſecting hook, and drawing it forward, I cut it off, with a curved pair of ſciſſars, as cloſe to its baſis as I was able. The remainder of the tumors inſtantly collapſed, and withdrew within the ſphincter; and, as they were quite ſoft, I did not think it neceſſary to ſearch further for them. The pain the operation occaſioned was much leſs than the patient had experienced for a long time after every motion. No hæmorrhage followed. I applied a compreſs dipped in a ſaturnine lotion over the anus, and bound it on with the uſual T bandage. An uneaſy ſenſation was experienced in the rectum during the whole of the firſt day, but the patient ſlept well in the night, and the following day was perfectly eaſy. On the third day he took a gently opening medicine, which procured him two looſe motions. Theſe were mixed with a ſmall quantity of blood; but gave him very little pain as they came away, and were followed with a very ſlight protruſion of the gut, which went back immediately on the application of the finger. He had not any occaſion to take medicines afterwards. The bowels in a ſhort time performed their proper office without pain or protruſion, and he became quite well in every reſpect. For a year and a half he continued free from any uneaſineſs of the hæmorrhoidal kind; but then the gut began to have a ſlight tendency to protrude whenever he had a coſtive ſtool. He took particular care to avoid this by an attention to his diet, and by the uſe of gently purgative medicines. As this, however, did not hinder the gut from occaſionally coming down, he was adviſed to take the ſize of a nutmeg of Ward's Paſte every morning and evening. He had not taken this medicine long before the tendency to a prolapſus entirely went off, and for the laſt two years he has not had the leaſt uneaſineſs in this part.

Case II. " Mr. B., a wine-merchant in the City, applied to Mr. Wathen and me, during the time we were connected together in practice, on account of a conſiderable number of hæmorrhoids which had been troubleſome to him many years; and, for ſome

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* " It has been obſerved above, that hæmorrhoidal tumors are not unfrequently occaſioned by a thickening of one or more of the plicæ or folds in the membrane which lines the inferior part of the inteſtinum rectum. I have reaſon to believe that this is much more frequently the cauſe of theſe tumors, than a varicoſe enlargement of any large blood veſſel that is ſituated in this part."

months prior to the time of his conſulting us, had often been ſo exceſſively painful, that, for hours after voiding his fæces, he was unable to move either from his bed or couch. On an examination I found the tumors very ſimilar to thoſe that are deſcribed in the preceding caſe. A conſiderable number of them was protruded through the ſphincter ani; and, nearly in the centre of theſe was one, much ſmaller than the reſt, which was exceſſively hard and painful, and very livid in colour. Having ſecured this hard tumor with a diſſecting hook, we immediately removed it with a curved pair of ſciſſars. No hæmorrhage followed the operation; and he became almoſt inſtantly eaſy. Nothing particular occurred in the ſubſequent treatment; and, from that period to the time of my drawing up this ſtatement of his caſe, which is upwards of ten years, he had not had the ſmalleſt tendency to a return of the diſorder.

CASE III. " Mr. D., a merchant in the City, about forty years of age, has been troubled with hæmorrhoids ever ſince he was ſeven years old; ſcarcely ever having had a ſtool, ſince this time, without the protruſion of one or more of them, which he has afterwards been obliged to return through the ſphincter ani by the preſſure of his fingers. They gave him, however, no further trouble till about three years ago, when, without any known cauſe, he was unable to keep them up, and they became ſo painful that he walked with difficulty; and in a ſhort time the pain increaſed to ſo great a degree, that he could neither ſleep nor continue long in any one poſture. In this ſtate he ſent for me. The caſe exactly reſembled thoſe which I have related above. In the midſt of a large number of hæmorrhoids, there was one much harder and darker coloured than the reſt, and exceſſively tender when touched with the finger. I gave him my opinion that the whole of his pain proceeded from this hard hæmorrhoid; and adviſed him to have it removed. His conſent was immediately given; and I cut it off, together with a ſmall hæmorrhoid near it, which ſeemed ſomewhat harder than the reſt, the ſame evening. The operation gave him very little pain, and was not followed by any hæmorrhage. He became eaſy almoſt as ſoon as it was performed, and afterwards paſſed a very good night. No hæmorrhage took place, nor did any accident follow; and in a few days he was well enough to return to his uſual buſineſs. There is however, ſtill, as there has been from his youth, a protruſion of part of the gut whenever he has a ſtool; but this he returns with great facility; and, as it gives him no further trouble, he is not uneaſy about it.

CASE. IV. " Mr. B. applied to me, about twelve years ago, on account of an excruciating pain, produced by hæmorrhoids, which had then continued a week with ſcarcely any intermiſſions. On an examination I found, as in the preceding caſes, in the midſt of ſeveral hæmorrhoids, one much harder than the reſt; which though ſmall was nearly black. I deſired him to ſtrain, that this black pile might become more viſible through the ſphincter ani; when touching it with the end of my finger, he immediately exclaimed that this was the part from whence his pain proceeded. Previous to the preſent attack, the patient had never been ſubject to any complaint of a ſimilar kind, but had enjoyed in all reſpects a good ſhare of health. I immediately removed the hard pile in the way above recommended; after which the pain very quickly abated. No hæmorrhage enſued, nor were any other dreſſings employed than the uſual compreſs and bandage. Within a fortnight he was perfectly cured, and returned to his buſineſs. He did not experience any further trouble from this part till about twelve months ago; when he was again attacked with an agonizing pain ſimilar to that he had before experienced; and a hard tender tumor was again protruded through the ſphincter ani, together with a number of others of a ſofter nature. He was now at a conſiderable diſtance from me; in conſequence of which I had not an opportunity of attending to him in this illneſs. The gentleman he conſulted recommended a free uſe of ſulphureous remedies, together with various ſoftening ointments to be applied to the protruded tumors; but a month had nearly elapſed before he experienced any laſting amendment from them. The pain then gradually went off, and the hard tumor diſappeared; ſince which time he has again enjoyed his uſual health."

In this inſtance Mr. Ware thinks it probable that the removal of the hard hæmorrhoid would have prevented the patient a great part of the pain he endured, and have much ſhortened the time of his confinement from buſineſs.

Case. V. " A lady who has borne many children, applied to me about three months ago, on account of a protruſion of hæmorrhoids through the ſphincter ani, which occaſioned her a continual uneaſineſs in this part. The diſorder commenced about three years ago, and was ſuppoſed to have been brought on by ſome active medicines which ſhe took about that period. For a long time the hæmorrhoids had been accuſtomed to bleed whenever ſhe had a coſtive ſtool; and for a month before ſhe conſulted me, not a day elapſed, in which ſhe had not loſt ſix or eight ounces of blood in this way; notwithſtanding which, there was very little diminution in her uſual menſtrual diſcharge. In conſequence of the pain and loſs of blood ſhe was exceedingly reduced both in ſtrength and ſize, and had entirely loſt her inclination for food. On an examination I found, as above deſcribed, a conſiderable number of hæmorrhoids protruded through the ſphincter ani; two of which appeared more prominent than the reſt; but they were not more tender, and there did not appear to be any difference in their colour. I ſtated my opinion to the patient, that the removal of theſe prominent piles would be a likely means of cauſing the remainder to collapſe, and of reſtraining the hæmorrhage which had ſo frequently returned, and ſo greatly weakened her. The next day I performed the operation. Having ſecured the tumors with a common hook, I cut them off with a curved pair of ſciſſars, as cloſe to their baſes as I was able. The hæmorrhage that followed was really trifling, and the gut immediately retracted within the ſphincter. A thick compreſs dipped in cold brandy and water was immediately applied, and the patient was directed to lie cool in bed, and to avoid hot drinks of every kind. She continued perfectly eaſy until the evening of the following day, when, having an inclination for a ſtool, ſhe voided a conſiderable quantity of grumous blood without any mixture of fæces. The nurſe who attended her was ſo much alarmed by its appearance, that ſhe wiſhed to ſend immediately for me; but the patient would not permit it, aſſuring her that for many days previous to the operation ſhe had voided as large a quantity of pure blood. The next morning ſhe took a table ſpoonful of caſtor oil, which procured her two looſe ſtools, without the leaſt mixture of blood, or the ſmalleſt protruſion of the inteſtine. The precaution I at firſt gave her to avoid hot drinks, and to lie cool in the bed, was ſtrictly regarded. She had a ſtool every day afterwards without the need of any medicine to procure it; and at the end of a fortnight every ſymptom of the diſorder was perfectly removed.

Case VI. " Mrs. H., about four years ago, had occaſion to take a purgative medicine, which unexpectedly operated with great violence. In conſequence of this, whenever ſhe had a ſtool afterwards, a part of the internal membrane of the rectum was protruded through the ſphincter ani, requiring the application of the fingers to return it to its proper poſition; and in a ſhort time the gut became ſo weak, that it came down whenever ſhe walked the diſtance of a hundred yards. She was not unfrequently alſo troubled with a conſiderable hæmorrhage from this part, which ſometimes came on ſuddenly, and occaſioned her great diſtreſs. Many remedies, both external and internal, had been made uſe of, but without affording her any relief. I at firſt ſuſpected that this was one of the common caſes of hæmorrhoids; and, as the patient was conſtitutionally coſtive, I directed her to take the ſize of a nutmeg of an electuary compoſed of ſulphur and cream of tartar mixed with lenitive electuary, once or twice every day, according as the ſtate of her bowels made it neceſſary. An ointment compoſed of equal parts of the powder of oak galls and elder ointment was alſo preſcribed to be applied, morning and evening, to the protruded gut. Theſe remedies, however, did not produce any good effect. She was then adviſed to introduce up the gut the end of a ſmall candle, about two inches long, and as thick as the little finger, once or twice every day, in order by its preſſure to hinder the protruſion, and, in this way, to give ſtrength to the weakened part. A thick compreſs at the ſame time was confined on the anus by a T bandage, which was bound on the part as tight as it could be borne, without giving pain. Theſe applications ſeemed at firſt to have a good effect in keeping up the gut; but in a ſhort time, the benefit they afforded ceaſed, and the introduction of the candle, and wearing the bandage, became a work of ſo much fatigue, that the patient could not be prevailed on to continue the uſe of them. I was now permitted to examine the ſeat of the diſeaſe, and I found the poſterior and inferior part of the rectum protruded through the ſphincter ani, about the ſize of the firſt joint of the little finger. There did not appear to be any diſtinct tumor in this part that could properly be denominated an hæmorrhoid; but the reſemblance between the two diſorders was ſo ſtrong, and the diſtreſs of the patient ſo great, that I thought myſelf fully juſtified in recommending the exciſion of the protruded part, in the ſame way in which I would remove an inflamed hæmorrhoid. The patient giving her conſent, I performed the operation on the following day. Having ſecured the moſt prominent part of the tumor with a hook, I cut it off in the uſual way with a curved pair of ſciſſars. The hæmorrhage that enſued was very inconſiderable; and the gut immediately returned to its proper poſition. I covered the part with a cold ſaturnine lotion, and bound it on with a T bandage. About two hours after the operation the patient felt an uneaſineſs in the rectum as if ſhe ſhould have a ſtool; and ſhortly afterwards a large quantity of thick blood was brought away. This much alarmed both the patient and her friends, and occaſioned them to ſend in haſte for me; their alarm being increaſed by a return of the hæmorrhage before I arrived. I immediately applied a doſſil of lint dipped in a ſtrong vitriolic lotion to the wound, and repeated the uſe of a thick compreſs dipped in a cold ſaturnine lotion to the external part of the anus. A bolus containing five grains of dragon's blood, and an equal quantity of alum, was given every two hours; the weight of the bed clothes was leſſened; and hot drinks of every kind were carefully avoided. No hæmorrhage of any conſequence took place after this plan was adopted. It was ſteadily continued for twenty-four hours; the compreſs being frequently dipped, during this time, in the cold ſaturnine lotion. The boluſes were afterwards given every four hours for another day. On the third the patient took ſome caſtor oil, which brought away a looſe ſtool with a ſmall mixture of blood, but without any protruſion of the gut. She had a ſlight ſenſe of ſoreneſs in the wound for about a month; but then the pain wholly went off; and from that time to the preſent, which is upwards of three years, ſhe has enjoyed her health perfectly in every reſpect."

We cannot conclude this ſection without ſtrongly recommending to the young practitioner a trial of this improved mode of extirpation in caſes of the hæmorrhoids requiring that kind of treatment; though the milder remedies ſuggeſted under MEDICINE may be reſorted to in leſs urgent caſes.

SECT. II. *Of* CONDYLOMATOUS EXCRESCENCES, *&c. of the* ANUS.

EXCRESCENCES are ſometimes produced about the anus, which from their figure get the name of *fici*, *ariſtæ*, &c.; but they are all of the ſame nature, and to be cured by the ſame means. They ſometimes grow within the gut itſelf, but more frequently are ſituated at the verge of the anus. They vary conſiderably in their colour, figure, and conſiſtence. Sometimes they are only one or two in number, but commonly all the ſkin about the anus becomes covered with them. They vary in ſize from that of ordinary warts to that of ſplit garden beans. They ſeem originally to be productions of the ſkin, though at laſt they ſometimes proceed as deep as the muſcles. They frequently remain long without producing much uneaſineſs. When this is the caſe, they ought not to be touched; but ſometimes they become ſo troubleſome as to render their removal neceſſary.

The ſofter kinds may frequently be removed by touching them daily with a pencil dipped in tincture of muriated iron, or rubbing them often with gentle eſcharotics, as crude ſal ammoniac, or pulvis ſabinæ; but the harder kinds are to be removed chiefly by lunar cauſtic, or by the knife; the latter of which is greatly preferable, and may be done with the utmoſt ſafety.

The ſores are afterwards to be treated like wounds produced by any other cauſe. If cauſtic is to be uſed, care ought to be taken that it do not injure the rectum.

SECT. III. *Of the* FISTULA IN ANO.

The FISTULA IN ANO is a ſinuous ulcer in the neighbourhood of the rectum. When it opens externally, and has likewiſe a communication with the gut, it is termed a *complete fiſtula;* but if it has no communication with the rectum, it is called *incomplete.* When the ulcer communicates with the gut, but has no external opening, it is named an *internal* or *occult fiſtula.* It is likewiſe diſtinguiſhed into ſimple and compound. The firſt is where one or more ſinuſes communicate with the internal ulcer, but where the parts in the neighbourhood are ſound. The compound fiſtula is where the parts through which the ſinus runs are hard and ſwelled, or where the ulcer communicates with the bladder, vagina, os ſacrum, and other contiguous parts.

Cauſes.] The cauſes producing the diſeaſe may be, whatever tends to form matter about the anus, piles, condylomatous tumors, hardened fæces, or any cauſe which produces irritation and inflammation, ſo as to end in ſuppuration.

Treatment.] As ſoon as a ſwelling about the anus appears to terminate in ſuppuration, every thing ought to be done which can accelerate the formation of matter. A proper degree of heat, warm poultices, fomentations, and the ſteams of warm water, are the means beſt ſuited for this purpoſe; and as ſoon as matter is formed, it ought to be diſcharged by a free inciſion in the loweſt part of the tumor. Much depends upon the proper treatment here; for if the opening be made too ſmall, or if long delayed, the matter gets into the looſe cellular ſubſtance, and inſtead of producing one, produces many ſinuſes, and theſe ſometimes running to a great depth. The parts ought then to be covered with ſoft lint ſpread with mild ointment, and an emollient poultice kept conſtantly over the whole. By this any remaining hardneſs will be removed, the cavity will fill up like impoſthumous tumors in other parts, and a complete cure will in general ſoon be made.

It more frequently happens, however, that the practitioner is not called in till the abſceſs has burſt of itſelf, and till matter has inſinuated into the ſurrounding cellular ſubſtance, and formed one or more real fiſtulæ.

The firſt thing to be done now is *to diſcover the real courſe of the different ſinuſes*, and the probe is the beſt inſtrument for this purpoſe. If there be openings in the external ſurface, there is commonly little difficulty in this. If they run along the perinæum or the muſcles, the probe will generally detect them. If they follow the direction of the gut, the beſt method is to introduce the fore finger oiled into the rectum, while the probe is entered at the external orifice. If there be a communication between the gut and the ſinus, the probe may be made to paſs till its point is felt by the finger in the rectum. We diſcover with certainty if a ſinus communicate with the gut, when air or fæces are diſcharged, or when any mild fluid injected returns by the anus.

After the courſe of the ſinus has been diſcovered, the method of cure is next to be conſidered. Aſtringent or eſcharotic injections, preſſure, and ſetons, are formidable, on account of the violent pain which they produce. The only method therefore of bringing on a proper degree of inflammation is a free inciſion along the whole courſe of the ſinus. The courſe of the different ſinuſes having been previouſly diſcovered, a laxative ought to be given on the day preceding this operation, and a clyſter an hour or two before performing it. The patient is to be placed with his back towards a window, while his body leans upon a bed, table, or chair. The finger of the ſurgeon is to be rubbed over with oil, and introduced into the rectum. The end of a crooked probe-pointed biſtoury (fig. 80) is then to be paſſed into the fiſtula, and puſhed againſt the finger in the rectum, if the fiſtula be complete. But in caſes of incomplete fiſtulæ, the point of the inſtrument muſt be made to perforate the gut before it can reach the finger. Some make the perforation with a ſharp-pointed biſtoury, which can be made to ſlip along the ſide of a probe-pointed one, as at fig. 81. After the biſtoury has reached the cavity of the rectum, the point of it is then to be brought out at the anus, and a cut made downwards to lay the ſinus completely open. In this operation the ſphincter ani muſcle is commonly cut, if the ſinus be high; but no inconvenience is found to ariſe from this circumſtance. It ſometimes, though rarely, happens, that the ſinus goes beyond the reach of the finger, and even as high as the upper end of the ſacrum. The only thing which can be done in this caſe is to cut as high as the finger can go, ſo as to give a free and eaſy vent to the matter.

Some practitioners, with a view to prevent troubleſome hæmorrhagies, and others to free the patient from the dread of the knife, have propoſed to open the ſinuſes by means of ligature (Plate III. fig. 82). By introducing one end of a piece of ſilver or leaden wire into the ſinus, then bringing it out at the anus, and twiſting the ends together, the contained parts may be ſo compreſſed as to produce a complete diviſion of them. But this is both more painful and tedious than the ſcalpel, and appears to be by no means preferable.

When the preſence of an *occult fiſtula* is ſuſpected, its exiſtence ought firſt to be fully aſcertained, by examining whether the matter which is paſſed by ſtool proceeds from an ulcer in the bowels or from an abſceſs at the ſide of the anus. It is diſcovered by matter from the bowels being mixed with the fæces, and no pain about the anus. In an occult fiſtula, a hardneſs, ſwelling, and diſcolouration, are obſerved upon ſome ſpot near the anus, and there is a ſenſation of conſiderable pain upon preſſure being made upon it. The operation in this is the ſame with that in the other two varieties of the diſorder; only that an opening is previouſly to be made, by a lancet or ſcalpel, in that ſpot where the matter appears to be lodged. By this the ſore will be reduced to a complete fiſtula, and the reſt of the operation will be eaſily performed.

Treatment in the compound fiſtula.] In this manner the different ſinuſes are to be operated upon, when in a ſimple ſtate; but in thoſe of a *compound nature*, where the parts in the vicinity of the ſores have been ſeparated from each other by an effuſion of matter into the cellular ſubſtance, and where all the under end of the rectum has, in ſome rare caſes, been detached from the ſurrounding parts, two modes of operating have been recommended; either to remove a portion of the external integuments, ſo as to give free vent to the matter; or to extirpate all the lower end of the rectum which is found to be detached from the ſurrounding parts. But from the pain and ſubſequent diſtreſs which they occaſion, theſe methods are judiciouſly laid aſide. All that is neceſſary to be done here is to lay the detached portion of gut completely open, as in caſes of ſimple fiſtulæ; but if this be inſufficient for allowing the gut to apply properly to the contiguous parts, another inciſion ſhould be made on the oppoſite ſide. If the neighbouring bones be found ſound, and the conſtitution in other reſpects be unimpaired, a complete cure will probably be obtained.

The matter ſometimes inſinuates itſelf between the ſkin and muſcles of the perinæum, or of the hip. When this is obſerved, the ſac produced by it ſhould be laid open from one end to the other by one or more inciſions as circumſtances may require. Sometimes, from neglect or improper treatment, the matter collected does not find a proper outlet, and then the parts moſt contiguous to it inflame, become painful, and gradually acquire ſuch a morbid calloſity as to put on a ſcirrhous appearance. In ſuch caſes a cure may be effected by giving free vent to the matter, preventing every future collection, and inducing and preſerving a ſuppuration in the ſubſtance of the parts chiefly affected. To accompliſh this laſt circumſtance, however, it may ſometimes be neceſſary not only to lay the ſinuſes freely open, but to cut upon the indurated parts.

Subſequent treatment.] The different ſinuſes having been laid open, care muſt be taken to apply the neceſſary dreſſings. Upon this much of the ſucceſs attending the operation depends. Dry lint, till lately, was much uſed by practitioners; but it has been found to produce ſo much irritation, eſpecially when too much crammed in, as to be one of the cauſes of that diarrhœa which is frequently ſo troubleſome after operations of this kind. Inſtead, therefore, of this ſort of dreſſing, pledgets of lint, or ſoft old linen ſpread with any ſimple ointment, are to be preferred. After the ſores have been cleared from clotted blood, the pledgets are to be gently inſinuated between their edges, but not to ſuch a depth, or with ſuch force, as to give any uneaſineſs. This being done, and a compreſs of ſoft linen with a T bandage being applied over the whole, the patient is to be carried to bed; and the dreſſings being renewed, either after every ſtool, or, when theſe are not frequent, once in the twenty-four hours, the ſores will generally fill up from the bottom, and will at laſt cicatrize in the ſame manner as wounds in any other part of the body. Sometimes, however, they acquire a ſoft, flabby, unhealthy aſpect, and the matter diſcharged from them is thin, fetid, and occaſionally mixed with blood. Theſe appearances may ſometimes ariſe from ſome part of a ſinus having been overlooked. In this caſe advantage may follow from the part being laid completely open. But it more uſually proceeds from ſome affection of the general ſyſtem; and till this is eradicated the ſores cannot be expected to heal.

In the cure of ſores in other parts of the body, practitioners have ſometimes found great advantage to ariſe from the uſe of iſſues. The ſame thing is now found to be applicable here. Wherever therefore fiſtulæ are of long ſtanding, while any diſorder exiſting in the conſtitution is properly attended to, practitioners recommend, that an iſſue, in proportion to the quantity of the matter diſcharged by the ſores, ſhould be immediately employed. In this way, if the bones in the neighbourhood are not diſeaſed, there will be reaſon to expect that a complete cure will be obtained.

Improved operation.] In 1789, *an experienced and ſucceſsful method of treating the Fiſtula in Ano,* was communicated by Dr. Mudge, of Plymouth, in a letter to Dr. Lettſom.

The ingenious writer, ſolicitous to remove every embarraſſment that may attend the operation for the Fiſtula in Ano, or the laying open, in a maſterly manner, and conſequently the cure of ſinous ulcers burrowing in the fat ſurrounding the rectum, invented a *ſpeculum ani*, by means of which the difficulty of coming fairly at the part is effectually obviated.

" Formerly," ſays Dr. Mudge, " when a ſinus running upon, or in the neighbourhood of the rectum was to be laid open, the generality of ſurgeons contented themſelves with doing it at random, with the probe ſciſſars; an imperfect, and therefore frequently an unſucceſsful mode of operating.

" Cutting alſo, on the common director, in a part ſo confined, and the neceſſary ſubſequent dreſſings to a wound ſo difficult of acceſs, were attended with uncertainties, and embarraſſments, which entitled the operator to little better hopes of ſucceſs.

" Mr. Pott, indeed, with his uſual ſkill and ſagacity, ſimplified, and greatly improved the old mode of operating; and the ſucceſs frequently attending his method, is a proof of its ſuperior merit; however, I think even his mode of operation capable of great improvement.

" When, therefore, ſinuſes, which run into, or burrow on, the fat ſurrounding the rectum, are to be laid open, and afterwards treated with proper dreſſings. I have many years, and with uninterrupted ſucceſs, adopted the following method:

" Firſt then, in order to ſee clearly and diſtinctly the parts to be operated upon, I have found ſome ſort of ſpecula abſolutely neceſſary; but thoſe I have employed, are of a very ſimple conſtruction: they are not unlike the gorget uſed in cutting for the ſtone, except that they are not ſo taper, and without the beak; (ſee Plate V.). The firſt and largeſt, is ſubſervient to the knife; the other, and ſmaller, is for facilitating the application of the ſubſequent dreſſings. In order, therefore, to lay open a ſinus, in its whole extent and direction, the patient ought, in order to empty the rectum, the evening preceding the operation, to take a doſe of rhubarb; then being placed in a proper ſituation, which will be found that of kneeling upon, not againſt, the ſide of a bed; his body ſhould be inclined forward and downward, ſufficiently ſo to ſpread the buttocks. If the ſinus is on the left ſide of the inteſtine, the fore finger of the left hand being firſt oiled, is to be introduced its whole length into the anus and rectum; and then the concave part of the large ſpeculum, oiled alſo, being placed upon it, is under that direction to be gently introduced almoſt its whole length, but ſo, that by preſſing the end of it againſt the finger, the rectum may not be injured by any corrugation of the inteſtine, between the inſtrument and finger. The ſpeculum being in the rectum, and the finger withdrawn, gives a fair view of the gut, provided the patient is placed advantageouſly for the light, to an extent of nearly four inches. A director is then to be introduced into the ſinus, the end of which, if it perforates the inteſtines, will be ſeen; or, if it does not, will be felt; and the cavity muſt be laid open its whole extent, with a ſtraight-edged knife. This being done, a doſſil of dry lint ſhould be applied with a probe between the lips of the wound, the whole extent of the inciſion, and the ſpeculum withdrawn; which will leave the dreſſing, provided the probe is kept upon it till then, in its proper place, with the lips of the wound cloſed upon it. On the ſucceeding dreſſing of the next day, the finger is again to be introduced, accompanied with the ſmaller ſpeculum, ſtill bearing on the oppoſite ſide of the rectum; when, if the patient has not had an intermediate ſtool, the dreſſing will be found in its place, and the wound ſeen in its whole extent.

" The conſideration now, is the giving the wound a good ſurface, by the removal of calloſities: this purpoſe is effectually anſwered by dipping a hair pencil in butter of antimony, and lightly touching, or ſmearing expeditiouſly, the whole wound, and its edges, therewith; which, by the aſſiſtance of the ſpeculum, will be done at the expence of a momentary pain, and with the utmoſt convenience and preciſion. Dry lint is then again to be placed into, and between the edges of the inciſion, and the ſpeculum withdrawn as before.

" After the next dreſſing or two, a ſlough will be thrown off, about the thickneſs of ſhammoy leather; when the ſurface of the wound will be found rather unfavourably ſmooth; but in a day or two after, by the uſe of a præcipitate medicine, the whole will have a proper granulating ſurface, and the wound uſually heals rapidly, without any intervening impediment. I need not obſerve that, excepting the inciſion, and the application of the cauſtic, both of which are momentary matters only, the whole is attended with ſo little pain, that the dreſſing ſpeculum, after introduction, is generally held by the patient himſelf. I uſually carry the ſpecula in my ſide pocket, that the patient may not feel them diſagreeably cold; and it may be neceſſary to obſerve, that they ſhould always be oiled before their introduction.

"An horizontal poſition of the trunk, during the cure, will be found to expedite it."

Dr. Mudge avoids enlarging upon the ſuperior advantages of the above mode of treating the fiſtula in ano; and thinks, as we do, that they will be apparent to every operator.

We ſhall conclude this ſection with the following *caſe of fiſtula in ano, from an uncommon cauſe.* The account is given by Dr. Harriſon, and appears in the Memoirs of the Medical Society of London.

"On the 25th of June, 1793," ſays the doctor, "I was deſired to give my opinion in the caſe of Mr. Baldock, a carpenter, aged about 40 years, who had for ſeveral months been troubled, as he ſaid, with a fiſtulous ulcer at the back part of the fundament, a little above the *ſphincter ani.* Notwithſtanding the inflammation and increaſed thickneſs in conſequence of it, I could paſs a probe in an aſcending manner towards the rectum, upwards of an inch, with great eaſe. Here the ſinus appeared to terminate; nor could I get the probe any further, although I made repeated efforts to puſh it into the inteſtine, with which I ſuſpected a communication. Having put the patient to ſome pain, I deſiſted from further trial, and deſired him to examine his *fæces* to ſee whether they were mixed or ſtreaked with purulent matter. The next ſtool aſcertained the exiſtence of pus, and determined me to make another attempt to find a paſſage into the rectum. When I had again reached the place, where the probe formerly ſtopped, I urged it with a greater effort, and the obſtruction giving way, the inſtrument paſſed without further trouble. I was ſenſible when it penetrated the reſiſting body, which at the time appeared to me like the *os unguis* of the ethmoid bone. This I mentioned to the gentlemen preſent, and afterwards we all perceived the grating againſt an hard brittle ſubſtance as the probe was paſſing into, or withdrawing from, the rectum, with which a communication was then open. In a few days the operation for a fiſtula was performed in the uſual manner, a little above the *ſphincter ani;* and, upon taking away the dreſſings on the third day after, we were ſurpriſed to find the core of an apple or pear among them. This brought to my recollection the circumſtance that occurred on examining the wound previouſly to the operation, and which I could not account for at that time. After waſhing the core we could clearly perceive where it was broken by the probe in its paſſage to the rectum. The wound healed in a ſhort time, and the patient has ever ſince enjoyed a good ſtate of health. When I enquired more particularly into what could occaſion ſuch an unuſual *phenomenon,* he replied, that about eight months before I was conſulted, he remembered to have eaten two or three apples, but could not recollect whether he ſwallowed the cores or not. He was confident that he had never taſted either apples or pears at any ſubſequent period. The diſorder had continued about thirteen weeks, when the operation was performed; and therefore originated in a cauſe that muſt have exiſted at leaſt eight months before.

“ Many diſeaſes are occaſioned by taking into the ſtomach matters that eſcape the ſolvent powers of the gaſtric juice. Theſe, by acting as nuclei, or by ſtimulating the inteſtines in their progreſs towards the *anus*, have laid the foundation of various complaints, which afterwards baffle the ſkill, and reſiſt the practice, of the moſt able phyſicians. Authors have recorded ſuch a long catalogue of theſe caſes, that it may appear unneceſſary to add another to the liſt; but, as far as my reading enables me to judge, no one has enumerated the cores of apples or pears among the cauſes of *fiſtula in ano*; and as it is an opinion, with many, that the kernels of fruit contribute materially towards digeſtion, it appears of conſequence to publiſh every fact that is calculated to remove this unhappy prejudice.

“ That inflammation and ſuppuration of the inteſtines may ariſe from the mechanical ſtimulus of an apple-core, will be readily admitted; nor ſhall we find more difficulty in accounting for its acting as a cauſe of fiſtula in this caſe. After being received into the ſtomach, it would be carried with the other indigeſtible matters into the inteſtines, where the periſtaltic motion would gradually urge it towards the *anus*. During this progreſs, the *fæces* acquire a greater conſiſtency, and, before expulſion, they often become ſo hard and firm as to require no ſmall ſtraining to force them through the ring. Such ſtrong efforts are ſufficient to impel any hard and rugged body againſt the rectum, and eſpecially where it is ſurrounded by the *ſphincter ani*, with force enough to bruiſe and enter the ſubſtance of the inteſtine. When once lodged there, the ordinary inclinations to go to ſtool, and irritations from the offending ſubſtance, will be more likely to thruſt it further into the coats of the gut, than change its direction towards the *anus*. Inflammation and ſuppuration, the natural conſequences of ſuch a proceſs, when they attack the lower part of this inteſtine, are commonly followed by ſinuous openings about the fundament. In this manner I account for the origin of *fiſtula in ano* in the preſent caſe; and heartily wiſh the recital of it may operate to diſcourage the too prevalent cuſtom of ſwallowing the indigeſtible cores, or kernels of fruit, along with their eſculent and ſoluble parts.”

SECT. IV. *Of* PROLAPSUS ANI.

This is a protruſion of part of the rectum beyond the anus. It is often occaſioned by debility of the parts, but is moſt frequently owing to violent exertions made in the rectum in conſequence of irritation. The reduction ſhould be effected as ſoon as poſſible;

for although this part of the inteſtine can bear expoſure to air much longer than any of the reſt, yet allowing it to remain a long time out would be attended with great uneaſineſs, and probably with danger. In the reduction, the tumor ought to be ſupported with the palm of one hand, while with the fingers of the other the part of the gut laſt protruded is to be returned. If the gut has been long expoſed previous to the reduction, venæſection may become neceſſary, and gentle aſtringents may be applied to the part; such as a decoction of cinchona or of logwood. The patient during the reduction is to be kept in a reclined poſture. As ſoon as the bowels are returned, a proper bandage (fig. 83) is to be applied. Such remedies are afterwards to be exhibited as moſt tend to recover the tone of the parts; and lotions of alum water, or a ſolution of vitriolated zinc, may be employed outwardly.

Sect. V. *Of* Imperforated Anus.

This diſorder, though not frequent, now and then occurs; and when preſent, unleſs ſpeedy relief be given, muſt prove fatal. In ſome caſes, the end of the rectum protrudes at the uſual ſituation of the anus, and is only covered with the common integuments; but in others, no termination of that gut is diſcoverable. Sometimes the rectum ends within an inch of the uſual ſeat of the anus; at others, it reaches no further than the top of the ſacrum. In ſome caſes it terminates in the bladder; in others, in the vagina. In the moſt favourable caſes, where the rectum protrudes, an opening may be readily made by a ſcalpel or lancet; but when no direction of this kind is met with, an inciſion is then to be made in the place where the anus is uſually ſituated, and is to be continued in the direction of the os coccygis and ſacrum, which is the courſe the inteſtine commonly takes. The finger is to be uſed as a director along it; the parts are to be cut either till fæces are obſerved, or till the inciſion has been made the length of the finger. If ſtill the fæces do not appear, a lancet-pointed trocar is to be puſhed forward upon the finger in ſuch a direction as the operator thinks will moſt probably reach the gut. An artificial anus is likewiſe to be attempted, where the gut terminates in the bladder or vagina. After the operation, the greateſt attention is neceſſary to preſerve the opening which has been made. Subſtances which irritate leaſt are the moſt uſeful; ſuch as doſſils of lint moiſtened in oil, and rolls of ſoft bougie plaſter.

CHAP. XXXIII. Of LUXATIONS.

Sect. I. *Of* Luxations *in general.*

A bone is ſaid to be *luxated* when that part of it forming a joint is moved out of its place. When the bone is forced entirely out of its cavity, the luxation is termed *complete;* when this is not the caſe, it is *partial* or *incomplete*. When there is alſo a wound of the ſoft parts communicating with the joint, it is called a *compound*, and when there is no wound, a *ſimple luxation*.

Symptoms.] The common ſymptoms of a diſlocated bone are, inability to remove the injured limb; pain, tenſion, deformity in the part affected; and ſometimes inflammation, ſubſultus tendinum, and fever: and theſe three laſt are greateſt in partial diſlocations. The ſwelling which firſt appears is always inflammatory; but afterwards a ſecondary ſwelling comes on, ſeemingly œdematous, and probably owing to the preſſure of the lymphatics by the diſlocated bone.

Prognoſis.] In judging of the practicability of reducing a luxation, we ought to attend to its nature and extent, the other circumſtances with which it may be complicated, and the length of time which it has continued. When a bone is only partially diſlocated, it is evident that it may be reduced with much more eaſe and certainty than where it is completely diſplaced. It is evident alſo that fracture attending diſlocation muſt render reduction much more difficult and uncertain. Indeed, when both the bones forming the joint are broken, there is the greateſt hazard of its remaining ſtiff during life, even when the greateſt attention has been paid. Luxated bones are moſt eaſily reduced immediately after they are diſplaced: the difficulty indeed of reducing them is generally proportional to the time that has intervened ſince the accident happened. When a bone has been ſome time lodged among the contiguous muſcles, it forms a ſocket for itſelf, and is firmly graſped by the ſurrounding ſoft parts. The cavity, too, from which it was diſlodged may be partially filled with ſome of the ſurrounding ſoft parts, or at leaſt diminiſhed by the conſtant action of the contiguous muſcles on its cartilaginous brim. Diſſections, however, ſhew, that inſpiſſated ſynovia does not, as was formerly ſuppoſed, fill up this cavity. In delicate conſtitutions and advanced periods of life, when the muſcles give little reſiſtance, diſlocations are more eaſily reduced than in the vigour of youth or in robuſt conſtitutions.

Treatment of ſimple luxations.] In the treatment, we ought, 1. To remove the diſlocation with as much eaſe and expedition as poſſible; 2. Retain the bone in its ſituation till the parts have recovered their tone; and, 3. Obviate all uneaſy ſymptoms.

(1.) When the ſurrounding ſkin and muſcles are much contuſed and inflamed, we ſhould endeavour to remove the inflammation by local bleeding, ſaturnine applications, and laying the limb in an eaſy poſture, before we attempt to reduce the bone, as conſiderable injury may be done by ſtretching a limb while the parts ſurrounding the joint are inflamed. The upper part of the limb ſhould be kept ſteady while the ſurgeon endeavours to replace the under bone, which alone is commonly diſplaced. This is not eaſily done; for the contractile power of the muſcles acts ſtrongly againſt every attempt, and not only draws it beyond the contiguous bone againſt which it ſhould be placed, but frequently forces it out of its natural ſituation, and fixes it firmly in ſome neighbouring cavity, from which it is with difficulty removed. To prevent this reſiſtance as much as poſſible, the muſcles ought to be put into a ſtate of relaxation. If this is properly done, the force neceſſary for reducing a luxated bone may generally be obtained by aſſiſtants alone; ſometimes, however, machinery is required, and various inſtruments have been invented for this purpoſe. Freke's machine is the moſt generally uſed. The force ought always to be applied in a gradual manner, and to the diſlocated bone alone, and not to any more diſtant parts of the limb. After the end of the diſlocated bone is brought into a line with that to which it is oppoſed, the reduction is eaſily completed, either by the action of the muſcles alone, or, if that is not ſufficient, by gentle preſſure.

(2.) After the reduction there is ſeldom any difficulty in retaining the bone in its place, unleſs it has often been diſlocated before. All that is neceſſary is to place the limb in a relaxed poſture, and to ſupport the bone with a bandage till the parts have recovered their tone.

(3.) The moſt urgent ſymptoms which accompany diſlocations are, pain, inflammation, and ſwelling. Theſe uſually abate ſoon after the reduction. If any degree of inflammation remain, the uſe of leeches is the beſt remedy.

Treatment of compound luxations.] When diſlocated bones are accompanied with fracture near the joint, the fracture muſt be allowed to heal before reduction be attempted. This, however, is not always neceſſary in very ſmall bones, as thoſe of the fingers. When the fracture is at a diſtance from the joint, the diſlocation may generally be reduced immediately. Compound luxations are to be treated nearly as compound fractures. After the bone is replaced, leeches ſhould be applied to abate the inflammation; after which the ſore ſhould be dreſſed with Goulard's cerate, or any other mild ointment, and the pain moderated by opiates and a low regimen: care ought alſo to be taken that no matter lodge about the joint. When luxations are produced by tumors or collections of matter in the neighbourhood of the joints, they may be conſidered as incurable: when they proceed from too great a relaxation of the ligaments and tendons of the joint, the bone can hardly be prevented from being now and then diſplaced; but the inconvenience may be ſomewhat obviated by ſupporting the limb with a proper bandage, by the uſe of the cold bath, and by electricity.

SECT. II. LUXATIONS *of the* BONES *of the* HEAD *and* NECK.

If the bones of the cranium be ſeparated by external injury, all that can well be done is, to ſupport the parts by a bandage, to prevent inflammation, to keep the patient quiet, and in a proper poſture, during the cure. The bones of the noſe are ſeldom luxated without fracture; when they are, the injury is eaſily diſcovered by the touch. When one of the bones is driven inwards, it may be raiſed and reduced by puſhing a tube of a proper ſize, and covered with ſoft lint, into the noſtril; which may be afterwards retained till there is no danger of the bone being again diſplaced. If the bone be luxated outwards, it may be reduced by the fingers, and retained by a double-headed roller. The *lower jaw* is luxated moſt frequently when the mouth is opened widely; it can only take place forwards and downwards, being there leaſt ſurrounded by the neighbouring parts: both ſides are generally luxated at once; and in that caſe the mouth is opened wide, the chin thrown forwards and towards the breaſt. When only one ſide is diſlocated, the mouth is diſtorted, and wideſt on the ſound ſide of the jaw, which is drawn a little towards the contrary ſide. The patient ſhould be ſeated, and his head ſupported. The ſurgeon ſhould puſh his thumbs, protected by a covering of ſtrong leather, as far as poſſible between the jaws, and then with his fingers, applied on the outſide of the angle of the jaw, endeavour to bring it forward till it move a little from its ſituation. He ſhould then preſs it forcibly down, and the condyles will immediately ſlip into their place. The thumbs ought to be inſtantly withdrawn, as the patient is apt to bite them involuntarily. The patient ſhould for ſome time avoid much ſpeaking or opening his mouth wide.

The reſult of the following caſe, publiſhed by Mr. Cowley, in the Medical and Phyſical Journal, ſerves to ſhew the propriety of our attempting to afford relief in thoſe caſes where the repeated endeavours even of the moſt experienced in the profeſſion have been defeated. The author relates it in the following words: "James Flocker, aged 29, of low ſtature, but of robuſt make, was admitted into St. Thomas's hoſpital on Sept. 25, 1800, with a luxation of the jaw. He ſaid, on the 27th of Auguſt laſt, he retired to bed at his uſual hour, in health; but at three o'clock the next morning, he awoke with a violent pain in the face, attended with much ſtiffneſs, and the mouth in an open, fixed ſtate. The ſame day he applied to two ſurgeons for advice, who both agreeing that it was a luxation of the jaw, attempted its reduction repeatedly, without ſucceſs: the patient remained under their care three weeks; but receiving no relief, he left the country for town, and on the above day applied at St. Thomas's hoſpital, with an evident luxation of the jaw; yet, in other reſpects, apparently in health. His appetite was good; pulſe full and regular; the muſcles of the face in a ſtate of rigidity; and his mouth ſore from the treatment he had received; ſo that the introduction of the finger was attended with much pain. Under theſe circumſtances, I conſidered much depended on my firſt attempt; and Mr. Birch (the ſurgeon under whoſe care he was admitted) having adviſed me to effect as complete a relaxation of the parts as poſſible, before any means were uſed for its replacement, I applied five leeches on each ſide of the face, in the direction of the maſſeter and temporal muſcles, which having dropped off, the after hæmorrhage was much increaſed by placing the patient in the warm bath at 98°, which was gradually increaſed to 106 degees of heat of Fahrenheit's thermometer. After the patient had been in twenty minutes, his pulſe ſunk, became irregular, and ſhewed ſymptoms of ſyncope; at this juncture (the patient remaining in the bath) I attempted to preſs on the jaw with my thumbs covered, but finding it impoſſible to act with advantage in this manner, I removed the incumbrance, and introduced them unarmed and preſſing on the jaw as far back as poſſible, beginning with a ſlight preſſure, ſlowly adding the force requiſite, I continued the extenſion downward, with a ſlight inclination forward, for ten minutes; at this time I tried to force back the jaw, and evidently perceived it to be altered in its ſituation; but on its producing ſome pain, the patient forced himſelf from my hands, and the foſſæ receiving the condyles of the jaw, being in a great meaſure filled up with an extravaſated ſubſtance (this I conſider to be the fact, from the jaw not ſlipping into its place ſuddenly, as is generally expected in theſe accidents), it reſumed its wrong ſituation with the greateſt facility. At this time his pulſe began to increaſe, both in ſtrength and fulneſs; I therefore immediately renewed my extenſion as before, and having continued it for ten minutes, again preſſed backward, and had the ſatisfaction to ſee it properly reduced. The parts were now ſecured by a bandage, and the patient retired to bed. 26th. He complains of pain in the direction of the temporal muſcles, his pulſe weak, ſoft, and ſlow; the ſymptoms of irritation are not however ſo great as expected, ſo that a confinement to bed is unneceſſary; he took an aperient draught this afternoon. 27th. His pulſe is increaſed in ſtrength and fulneſs; the draught procured him three motions, which gave great relief; from this time he may be conſidered as in perfect health, capable of maſticating ſolid food, and in every other reſpect as well as before the accident. October 9, he was ſent out of the hoſpital, cured."

When *the head is luxated*, it commonly falls forward on the breaſt, the patient is inſtantly deprived of ſenſe and motion, and ſoon dies if the luxation be not quickly reduced. In reducing the luxation, the patient ſhould be placed on the ground, and ſupported by an aſſiſtant: the ſurgeon ſtanding behind ſhould gradually pull up the head, while the ſhoulders are preſſed down by the aſſiſtant till the bones are brought into their place, which is known by a ſudden crack or noiſe; if the patient be not dead, he immediately recovers his faculties, at leaſt in ſome meaſure. He ſhould then be put to bed with his head elevated and retained in one poſture. He ſhould loſe a quantity of blood, and live for ſome time on a low diet.

SECT. III. LUXATIONS *of the* SPINE, OS COCCYGIS, CLAVICLE, *and* RIBS.

The vertebræ are ſometimes partially, but hardly ever completely, diſlocated without fracture. When theſe occur high up, they are attended with the ſame ſymptoms as diſlocation of the head: when further down, beſides diſtortion of the ſpine, paralyſis enſues of every part of the body ſituated under the luxated bone; there is commonly alſo either a total ſuppreſſion of urine, or it is diſcharged involuntarily together with the fæces. As luxations of this kind are generally owing to falls or violent blows, the vertebra is driven either forwards or to one ſide; it is therefore very difficult to reduce it. The beſt, as well as the ſimpleſt method, is to lay the patient on his face over a cylindrical body, as a large caſk, and at the ſame time to attempt to replace the bone with the fingers. If the bone be very much diſplaced, there is very little reaſon to hope for ſucceſs. The *os coccygis* is more liable to diſlocation than any other part of the ſpine. It is ſometimes forced outwards in laborious births. This is diſcovered by the great pain which is felt at the connection of the os occygis with the ſacrum, and by the bone appearing to be diſplaced when examined. It may generally be eaſily reduced by preſſure with the fingers. The beſt ſupport afterwards is a compreſs, with the T bandage. When the coccyx is luxated inwardly, the patient complains of ſevere pain, teneſmus, and a ſenſe of fulneſs in the rectum; the fæces are paſſed with difficulty, and in ſome caſes a ſuppreſſion of urine takes place. The injury is eaſily diſcovered by introducing the finger into the anus. In this caſe the bone ſhould be preſſed outwards by introducing the fore and middle fingers of one hand, dipped in oil, into the rectum, and ſupporting the parts which correſpond with it externally till the reduction is accompliſhed. Diſlocations of theſe bones are apt to excite inflammation, which often terminates in dangerous abſceſſes; it ought, therefore, to be guarded againſt by every means in our power.

The *clavicle* is moſt frequently luxated at its junction with the ſternum; becauſe the violence which produces the injury is generally applied to the ſhoulder. The luxation is diſcovered by pain in the part, by the projection of the bone, and by the immobility of the ſhoulder. It is eaſily reduced by puſhing the bone into its place with the fingers, while an aſſiſtant draws back the arms and ſhoulders. It is not ſo eaſy to retain the bone in its place. When it is the inner extremity of the clavicle which has been diſlocated, the ſhoulder ſhould be kept in its natural ſituation, neither raiſed nor depreſſed: the fore-arm ſhould be ſupported, as ſhould alſo the head and ſhoulders, and a moderate preſſure ſhould be made upon the diſplaced end of the bone. For this purpoſe the machine repreſented fig. 64 in Plate III. the invention of Mr. Park, of Liverpool, anſwers beſt. But when the outer extremity of the clavicle has been diſlocated, the ſhoulder muſt be conſiderably raiſed, the arm ſupported in a ſling, and the bone kept in its proper ſituation by a ſmall compreſs placed over its end, and ſecured by a roller forming the figure 8; or it may be retained by the machine above mentioned. The bandage ought to be retained for a conſiderable time.

Luxations of the *ribs* are exceedingly rare. The ſymptoms are nearly the ſame as thoſe ariſing from fracture, only that the pain is more ſevere at the articulation, and that no other ſpot but that will yield to preſſure. All that can be done is to bend the body forward over a caſk, or ſome ſuch thing, in order to aſſiſt the viſcera in preſſing out the rib. Bandages are of little uſe. The patient ſhould be kept quiet, and fed on a low diet: inflammation ſhould be prevented, and opiates given if he have a troubleſome cough.

SECT. IV. LUXATIONS *of the* BONES *of the* SUPERIOR EXTREMITIES.

The head of *the os humeri* is moſt frequently diſlocated forwards and downwards, ſometimes downwards and backwards, but never upwards, without a fracture of that part of the ſcapula which is placed above the joint. The luxation is diſcovered by the patient's inability to raiſe his arm, by violent pain attending the attempt, by the luxated arm being of a different length from the other, by the head of the humerus being felt out of its natural ſituation, while a vacuity is perceived under the acromion, and by the flatneſs of the injured joint, while the ſound one has its natural fulneſs. When the luxation is of long ſtanding, the whole arm is apt to become œdematous.

The patient ſhould be ſeated on a chair, and his body ſecured by a broad belt paſſed round it, and held by aſſiſtants. The elbow ſhould be bent, in order to relax the muſcles on the fore part of the luxated joint. A firm leather belt four or five inches broad, with ſtrong ſtraps, and lined with flannel, is to be tied round the arm immediately above the elbow: aſſiſtants are to extend the arm gradually, by pulling theſe ſtraps, while another aſſiſtant draws back the ſcapula. The ſurgeon ſtands on the outſide of the arm, directs the aſſiſtants, and varies the direction of the extenſion, according to the ſituation of the head of the bone. As ſoon as the head of the bone has cleared the brim of the ſocket, the muſcles draw it into its place, a crack is heard, the patient is relieved, and the inferior part of the ſhoulder acquires its uſual fulneſs.

Various *other modes* of extending the arm have been propoſed in difficult caſes; as, ſuſpending the patient by the luxated arm over the ſtep of a ladder or the top of a door, raiſing him up by the arm with ropes running over pulleys fixed in the ceiling of a room, &c. The jerk produced by the body being ſuddenly raiſed and let down again on a feather bed, has ſometimes ſucceeded when other means have failed. A gentler method is to lay the patient on the floor, while two or three ſtout men ſtanding on a table lay hold of him by the arm and pull him up. But all theſe methods are in danger of lacerating the ſoft parts by the ſuddenneſs with which the force is applied, and even ſometimes of breaking the end of the humerus if it be preſſed againſt the neck of the ſcapula. Mr. Freke's improvement on the ambé of Hippocrates, has been conſidered as the beſt machine for extending the arm. But machinery is very ſeldom neceſſary; even caſes of long ſtanding may, by proper management, be reduced by means of aſſiſtants, provided reduction be at all practicable. Inflammation after the operation ſhould be obviated by the uſual remedies. If the bone be apt to ſlip out again, which ſometimes happens after repeated diſlocations, the arm ſhould be ſupported in a ſling till the parts have recovered their tone. Bliſters, frictions, ſtimulating medicines applied to the ſhoulder, and cold water poured on it, have ſometimes been uſeful in reſtoring the ſtrength of the joint.

Luxation at *the elbow* moſt commonly happens upwards and backwards; and then the fore-arm is ſhortened, the end of the ulna projects behind, and is higher than uſual, while the extremity of the humerus can be felt in the bend of the elbow. The ſurgeon ſhould take hold of the wriſt with one hand, and the upper part of the fore-arm (which muſt be moderately bent) with the other, and gradually pull the top of the fore-arm downwards, while at the ſame time he increaſes the curvature of the elbow to diſengage the ends of the bones from each other. He ſhould then pull the bones forward into their ſituation. When the luxation happens upwards and forwards, it ſhould be reduced while the arm is extended. After the reduction, the muſcles of the fore-arm ſhould be kept relaxed, by bending the elbow a little, till the parts have recovered their tone. When the bones of the fore-arm are diſlocated from each other, which happens moſt frequently at the wriſt, the rotatory motion of the hand is deſtroyed. After the reduction, the bones ſhould be bound together by a tight flannel roller, or a couple of ſplints ſhould be applied along the fore-arm, and the arm ſupported in a ſling.

The bones of *the wriſt* are not ſo often luxated as might be expected from the ſmallneſs of their ſize. When they are, great ſwelling and pain enſue, and the motion of the joint is entirely deſtroyed. Great attention is neceſſary, leſt luxation ſhould be miſtaken for a ſprain. The arm and hand ſhould be ſupported by aſſiſtants, but not ſtretched; and then the bones ſhould be puſhed into their place, and afterwards retained by proper bandages and ſplints. The bones of the metacarpus, when they happen to be diſlocated, which is very ſeldom, are to be reduced in the ſame manner. Diſlocations of the thumb or fingers are eaſily diſcovered. To reduce them, an aſſiſtant ſhould hold the phalanx from which the diſlocation happened, while the ſurgeon endeavours to elevate the bone from the one contiguous to it, and to paſs it into its place.

The recital of various caſes of luxation of the ſuperior extremity would be endleſs, and of little avail to the reader, we ſhall therefore merely introduce the following caſe of diſlocated ſhoulder, which is ſuch a one as very ſeldom happens. It is given in the Medical and Phyſical Journal, by Mr. Evans, of Ketley, in the following terms:

" January 9, 1801, Wm. Whittingham, a labouring man, 64 years of age, applied to me with his left ſhoulder apparently much bruiſed, in conſequence of a fall he had met with a few days before. The man was in liquor when the accident happened, ſo that he could give me no ſatisfactory account in what poſition his arm was in at the time he received the injury. On examination, I found the whole ſhoulder ſo much ſwelled, that I could not feel either the head of the os humeri or the extremity of the ſcapula; and, as the arm could be brought cloſe to the ſide without difficulty or pain, I of courſe concluded there was no diſlocation; therefore directed the ſhoulder to be well rubbed twice a-day with a volatile embrocation, and a ſtale beer poultice to be applied till the tumefaction ſubſided.

" In nine days after (about a fortnight from the time of the accident) he came to me again, with his arm and hand much ſwelled, but the ſhoulder greatly reduced in ſize, complaining of conſiderable pain in that part of the arm where the deltoid muſcle is inferted into the os humeri.

" I had now a fair opportunity of examining the true ſtate of the ſhoulder, which, to my great ſurpriſe, I diſcovered to be completely diſlocated *backwards*; the head of the os humeri lying evidently *upon* the ſcapula. In the afternoon of the day he applied to me, I, with proper aſſiſtance, attempted the reduction by making a gradual extenſion with the fore-arm bent (the method I have adopted with ſucceſs for many years, when the head of the bone lay in the axilla, or under the pectoral muſcle); notwithſtanding repeated trials, I gained no advantage. Thus foiled in my efforts, and the patient being a good deal fatigued, I poſtponed any further attempts until the following morning. In the interim, I recollected Mr White's method of reducing diſlocated ſhoulders of ſeveral months' ſtanding, which determined me to adopt the ſame mode of practice, eſpecially as my patient's caſe correſpond much with that of James Dawſon's, mentioned in page 100 of Mr. White's Caſes in Surgery, excepting that the head of the os humeri was forced *upon* the ſcapula, and not *under* it, as related by Mr. White.

"The man being placed in a ſitting poſture on the floor, was kept firmly in that ſituation by an aſſiſtant. Two ſtrong perſons ſtood upon a table, and endeavoured to raiſe the patient by his diſlocated arm, while I attempted to guide the head of the bone into the ſocket, but all our exertions proved ineffectual; which I attributed, in ſome degree, to want of ſufficient power, and alſo to the oppoſition the biceps muſcle (being on the ſtretch) might probably give us. I therefore procured a ſet of braſs pulleys, uſually employed for raiſing of timber and other heavy materials, and faſtened them to a ſtrong hook which was fixed in a beam at the top of the room. I then defended the man's arm above the elbow with a thick cotton handkerchief wrapped ſeveral times around it, over which was applied a ſtrong towel, ſecured firmly to a cord that paſſed over the pulleys. One of the aſſiſtants made a gradual and powerful extenſion by pulling at the cord, the other kept the fore-arm bent, with the elbow in an oblique direction backwards, while I, at the ſame time, with one hand preſſed down the ſcapula, and with the other, endeavoured to diſlodge the head of the bone. In the ſpace of a few ſeconds I had the ſatisfaction of feeling it give way, and hearing it crack as it went into its place. Upon which the patient with great ecſtacy cried out, "It is in." He was then ſet at liberty; and, on examination, I found he was perfectly right in his aſſertion. He became immediately eaſier, and by carrying his arm in a ſling for a few days, the ſwelling gradually ſubſided. At the end of a fortnight he was able to return to his uſual employ."

SECT. V. LUXATIONS *of the* BONES *of the* INFERIOR EXTREMITIES.

From the great ſtrength of *the hip joint*, it was formerly believed that the head of the thigh bone was never luxated by external violence: but it is now known that it happens by no means unfrequently. The ball in ſtarting from its ſocket generally paſſes forwards and downwards into the foramen thyroideum. When this happens, the limb is conſiderably lengthened, the head of the bone is lodged near the under and fore part of the pelvis, the large trochanter is obſerved on the fore part of the thigh, a vacancy is perceived where the head of the bone and the trochanter ſhould be, and the toes are turned outwards. When the bone is diſlocated upwards and backwards, the limb is ſhortened, the great trochanter higher than uſual, the knee and foot turned inwards.

When it is diſlocated upwards and forwards, the leg is ſhortened, the ball of the bone is felt on the os pubis in the groin, and the great trochanter on the upper and lower part of the thigh; a vacancy is diſcovered on the correſponding part of the hip; the knee and toes are turned outwards. When the ball ſlips downwards and backwards, the leg is lengthened, the toes turned inwards, and the great trochanter is lower than that of the other limb. If the ball ſlip directly downwards, the leg is lengthened, but the knee and toes keep nearly their natural ſituation. It is ſometimes difficult to diſtinguiſh between luxation and fracture of the neck of the bone. In fractures, the bone is moſt frequently puſhed upwards, and the leg ſhortened, the knee and point of the toes are turned inwards, and may be moved much more readily outwards and inwards than when the bone is diſlocated.

For *reduction*, the patient ſhould be laid on a mattreſs, on the ſound ſide, and a woollen roller covered with ſeveral folds of flannel placed between his thighs, and fixed firmly by ſtraps to the wall. A ſtrong bandage of buff leather, or ſomething ſimilar, ſhould be applied to the under end of the thigh, with ſtraps fixed to it to make the extenſion. The trunk of the body ſhould be properly ſecured, and the joint of the knee bent. The extenſion ſhould be made at firſt gently, and increaſed gradually, while, at the ſame time, the thigh is made to roll in different directions. When the extenſion is ſufficient, two aſſiſtants ſhould lay hold of the roller, and attempt to raiſe the bone; the extending force ſhould then be ſlackened, and the ſurgeon ſhould puſh the head of the bone upwards and outwards, while an aſſiſtant preſſes the knee forcibly inwards. The muſcles themſelves will then commonly bring the bone into its place; and this is done with ſuch a jerk and noiſe, that it is heard by the byſtanders. If the reduction be not obtained, the extenſion muſt be repeated with greater force. Inſtead of the roller, a broad ſtrap or table cloth is frequently uſed. The limb ſhould not be uſed for ſome time after reduction, and inflammation ſhould be prevented by the proper remedies.

The *patella* can neither be luxated upwards nor downwards, without rupture of the tendons of the extenſor muſcles, or of the ſtrong ligament which fixes it to the tibia; but it may be luxated to either ſide. The luxation produces lameneſs, and much pain on attempting to move the joint. In recent caſes the injury is eaſily diſcovered; but when the ſurgeon is not called immediately, the ſwelling may be ſo great as to render it more difficult. For reduction, the limb ſhould be kept extended; the ſurgeon, by depreſſing the edge of the patella moſt diſtant from the joint, is enabled to raiſe the other, and puſh the bone into its place.

It may be neceſſary to remain a day or two in bed till the knee recover its tone. Sometimes, after the bone has been diſplaced, returns of the ſame complaint become frequent. In ſuch caſes, proper machinery applied to the ſide of the knee, where the bone is apt to ſtart out, is uſed with advantage.

From the ſize of the joint, and the great ſtrength of the ligaments, luxations of the tibia from the os femoris rarely occur. When it does, it is eaſily diſcovered by the pain, lameneſs, and deformity of the limb. The patient ſhould be laid on a table, the muſcles relaxed, and the thigh ſecured by aſſiſtants; the limb ſhould then be extended, and the bones cleared of each other, when they will be eaſily replaced. After the reduction, the limb ſhould remain for ſome time perfectly at reſt; and inflammation, which is very apt to enſue, and is attended with very bad conſequences, ſhould be aſſiduouſly guarded againſt.

If the *ankle-joint* be diſlocated forwards, the fore part of the foot is lengthened; if backwards, the foot is ſhortened and the heel lengthened (this is the moſt common variety); if to either ſide, there is an uncommon vacancy on the one ſide, and a prominency on the other. Diſlocation, however, can hardly take place outwardly without fracture of the end of the fibula.

For reduction, the limb ſhould be firmly held by aſſiſtants, the muſcles relaxed, and extenſion made till the bones are cleared of each other, when the aſtragalus will eaſily ſlip into its place.—The ſame rules ſhould be obſerved in reducing diſlocations of the bones of the foot. Luxations of the metatarſal bones and toes are reduced exactly in the ſame manner as the bones of the metacarpus and fingers.

CHAP. XXXIV. OF FRACTURES.

SECT. I. *Of* FRACTURES *in general.*

THE term *fracture* is generally confined to ſuch diviſions in bones as are produced by external injury. When the integuments remain ſound, the fracture is called *ſimple*; when it communicates with a wound, it is called *compound*.

Symptoms.] The general ſymptoms of fracture are pain, ſwelling, and tenſion in the contiguous parts. A grating noiſe when the part is handled, diſtortion, and a certain degree of loſs of power in the injured part, accompany almoſt every fracture, except when it runs longitudinally, and the divided parts are not completely ſeparated from each other. When there is only a ſingle bone in a limb, a fracture is eaſily detected; but where only one or two bones of a limb has ſuffered, it is often difficult to judge with certainty, eſpecially if the contiguous ſoft parts be tenſe and painful before the practitioner is called. In that caſe, the opinion muſt be regulated, not only by the attendant ſymptoms, but, 1ſt. By the age and habit of the patient; for bones are more eaſily fractured in old than in young perſons. Different diſeaſes, too, induce brittleneſs of the bones, as the lues venerea and ſea-ſcurvy. 2d. By the ſituation of the part; for bones are more apt to be fractured in the ſolid parts of their bodies than towards their extremities, where they are more ſoft and pliant. 3d. By the poſture of the limb; for a weight may fracture a bone lying on an unequal ſurface, which it would have ſuſtained without injury if equally ſupported. Fractures are ſometimes attended with a great degree of ecchymoſis, occaſioned by the ends of the fractured bones wounding ſome of the contiguous blood-veſſels.

Prognoſis.] In giving a prognoſis of fracture, various circumſtances are to be attended to. It is evident that ſmall fractured bones are more eaſily healed than large ones, and that the fracture of the middle of a bone is not near ſo dangerous as near the extremity. A cure is effected much more readily in youth than in old age, and in good conſtitutions than in bad. We ought alſo to attend to the concomitant ſymptoms, and the injury which the neighbouring parts may have ſuſtained. The more moderate the ſymptoms, the more favourable our prognoſis may be.

Treatment.] The treatment of fracture conſiſts of three particulars; replacement, retention, and obviating bad ſymptoms.

1. When bones are fractured directly acroſs the parts, they are often very little moved from their natural ſituation; but when the fracture is oblique, they are apt to paſs over each other, and to produce much uneaſineſs and deformity; the contiguous muſcles are ſeverely injured, and the pain is aggravated by the ſlighteſt motion. The ſurgeon ſhould put the limb into the beſt poſture for relaxing all the muſcles connected with it, according to the practice firſt introduced by Mr. Pott. If it be properly attended to, the ends of the bones will in general be eaſily replaced. When any difficulty occurs, a ſmall degree of extenſion may be made, taking care to keep the muſcles as relaxed as poſſible. Much attention ſhould be paid to replacing the bones properly, otherwiſe the limb will remain for ever after diſtorted.

2. After the bones are replaced, the limb ſhould be laid in the eaſieſt poſture, and the bones afterwards retained in their ſituation by proper compreſſes and bandages, not applied too tightly, till the cure be completed. The time neceſſary for this purpoſe depends on the ſize of the bone, the age and habit of the patient, the ſteadineſs with which the limb has been retained in its place, and the violence of the attending ſymptoms. In middle-aged perſons, and under favourable circumſtances, a fracture of the thigh bone, or of the bones of the leg, may be cured in two months; of the arm bone, or bones of the fore-arm, in ſix weeks; of the ribs, clavicles, and bones of the hand, in three weeks. In infancy the cure will take a ſhorter, and in old age a longer, time than this.

3. In ſimple fractures, the inflammatory ſymptoms generally ſubſide in a few days. When they become worſe, which is ſometimes the caſe, aſtringent applications ſhould be employed. If theſe fail, blood ought to be drawn from the parts affected. This is of ſo much advantage, that it ought never to be omitted where the ſurrounding ſoft parts are much injured. Friction with emollient oils, warm bathing, the uſe of Bath and other ſimilar waters, are alſo of much ſervice. The limb ſometimes puts on a clumſy appearance from an overgrowth of callus. When this tendency appears, ardent ſpirits and other aſtringents are conſidered us uſeful; ſometimes preſſure on the part by a thin plate of lead fixed by a bandage may be advantageous. Many inſtances occur, however, where no remedies prove ſuccefsful: the patient ought therefore to be acquainted beforehand with the probable event, to prevent unpleaſant reflections afterwards.

Sometimes the ends of the bone remain looſe long after they might have been re-united. This may be owing to ſome conſtitutional diſeaſe, to the bones not being kept ſteadily in contact, to ſome of the ſoft parts getting in between them, or to the bone being broken in different places, and the intermediate fractures being too ſmall to adhere. Pregnancy has alſo been mentioned as a cauſe. By removing theſe obſtructions, a perfect union may in recent caſes be accompliſhed. But where the caſe is of long ſtanding, the callus of bones becomes ſo hard and ſmooth as to move with the eaſe of a joint, ſo that no advantage can be derived from laying them together. In that caſe, an inciſion ſhould be made through the ſoft parts, and a ſmall portion of the ends of the bone removed with a ſaw. If this be properly performed, nature will ſupply the deficiency. When ſmall pieces of bone remain long looſe, they ſhould be extracted by making an opening. The intervention of muſcles or other ſoft parts is known by the very ſevere pain and tenſion, and by particular motions of the limb cauſing great pain and twitching of the muſcles which move it. The limb ſhould be put into all the variety of ſituations; and if this does not ſucceed, an opening muſt be made, and the ſoft parts removed. Sometimes in fractures, blood-veſſels are ruptured by the ſharp ſpiculæ of the bone: this happens moſt commonly in compound fractures. When the effuſion of blood is great, the part ſwells ſo much that it is neceſſary to lay it open, and to ſecure the divided veſſels by a ligature. When the ſwelling is not great, the abſorption of the blood is truſted to nature. When the blood remains long in contact with the fractured bone, it ſometimes prevents the formation of callus; the perioſteum ſeparates from a conſiderable portion of the bone, and a thin fetid ſanies is diſcharged at the wound. When this happens, no cure can be expected till the parts of the bone deprived of perioſteum have exfoliated, or have been ſeparated by a ſaw.

Mr. Carliſle, ſurgeon to the Weſtminſter hoſpital, has publiſhed the following obſervations, on ſimple fractures where the union fails, in the Medical and Phyſical Journal:

"One of the unpleaſant accidents which occaſionally happen in the treatment of ſimple fractures of the cylindrical bones," ſays he, "is the *failure of union*. It may poſſibly have occurred to ſome of your readers to note particular circumſtances either in the general conſtitution, the mode of treatment in ſuch caſes, or peculiarities in the manner of the fracture. As I have not met with any ſatisfactory reaſons for the defect of oſſific union in thoſe occaſional inſtances, I beg leave to ſtate the following hiſtories, which may perhaps induce gentlemen of greater experience, and better knowledge, to clear up this obſcurity. The following three caſes were the ſubjects of memorandums at the time they preſented themſelves, and which record is as follows.

"A ſailor, about forty-five years of age, on board one of his majeſty's ſhips of the line on the Jamaica ſtation, had his thigh fractured by a fall, and ſoon afterwards returned home with a fleet. After fifteen months the broken thigh had not acquired any firmneſs, but it was eaſily moved, as if a joint was formed at the fracture. The ends of the broken bone had paſſed each other two inches. The man was athletic, of dark complexion, chewed much tobacco, and drank ſpirituous liquors whenever he could obtain them. By his own account, the treatment of his limb, both as to bandages and reſt, had been according to the common routine. This man was induced to undergo a painful operation; both ends of the fractured femur were ſawed off to the extent of an inch and a half from each, and although the limb was carefully attended to, yet the union did not obtain, and he remained to the time of his death with a flexible joint in the middle of his thigh.

"A young athletic man, between twenty and thirty years of age, by trade a houſe carpenter, had a ſimple fracture of the os brachii about its middle; the bandages and ſplints in common uſe were applied, and it was concluded as a matter of courſe that his limb would become firm in the ordinary time. At the end of ſix months I obſerved him ſtill uſing the ſling, and carrying his fore-arm and hand like a dead limb. On removing the bandages the fracture had not united, and motion of the limb did not occaſion pain in the part. This man was a patient in the Weſtminſter hoſpital, and had been enjoined low diet and extenſive evacuations, which over-anxiety on his part had carried to great extent. His limb had always hung low in the ſling, the fore-arm and hand were conſtantly œdematous, and the upper arm had ſtretched full two inches in length, ſo that the ends of the fracture were ſeparated to this diſtance. I ſaw him twelve months afterwards with a diſunited brachium, having tried a variety of methods to excite union, but all unſucceſsfully.

"A ſoldier, between thirty and forty years old, had his tibia broken and fibula diſlocated; he had been treated in a military hoſpital, and the lowering plan carried to its full extent. After ten months the broken bone was looſe, although a piece of ſplinter appeared to be intervening; it is very probable that this man's limb became firmer, but I have never heard of his fate.

"Although caſes of defective oſſification after ſimple fractures are uncommon, yet when they do happen it is very diſtreſſing to both the patient and practitioner. Nor is there any decided inference to be drawn from theſe caſes, as to the certain cauſe of ſuch misfortunes.

"The ſailor's thigh did not fail, becauſe the broken ends were puſhed beyond each other; for this commonly happens to the ſame extent, and yet the fracture unites; and the reſult of his operation ſhewed ſomething like a conſtitutional deficiency in the oſſific proceſs.

"The carpenter's arm muſt have been in a favourable poſition for union during the earlier period, for it was kept remarkably ſtraight.

"The ſoldier had experienced no other treatment or ſymptom beyond what may be conſidered as common routine.

"In all theſe men the vaſcular ſyſtem appeared ſluggiſh, their pulſes were ſlow, and the characteriſtics of inflammatory diſpoſition were wanting. Perhaps, in ſuch conſtitutions where the oſſific union has once failed, or where the ſluggiſh, inactive diſpoſition of the vaſcular ſyſtem is well marked, it may be prudent to watch the natural progreſs of inflammatory ſymptoms; to moderate them when actually preſent, *rather than to anticipate their appearance*; and after the thirtieth day, to commence a more generous regimen."

SECT. II. FRACTURES *of the* BONES *of the* FACE.

Fractures of *the noſe* may impede reſpiration, affect the ſpeech and ſenſe of ſmelling, give riſe to polypi and tedious ulcers, and may beſides be dangerous from their vicinity to the brain. When any part of the bones of the noſe has been raiſed above the reſt, it is to be preſſed into its place with the fingers; if it has been puſhed into the noſtril, it is to be raiſed with the end of a ſpatula or other ſimilar inſtrument. If any portion be almoſt entirely ſeparated from the reſt, it ſhould be removed; but if it adheres with conſiderable firmneſs, it is to be replaced. If the bones, after being replaced, do not remain in their proper ſituation, they are to be retained either by tubes introduced into the noſtrils, or by a double-headed roller, with proper compreſſes as the caſe may require. Inflammation ſhould be prevented by the proper remedies.

Much care is neceſſary in replacing the fractured bones of the face, and in dreſſing them, in order to prevent deformity. The dreſſings may be retained by adheſive plaſters. Inflammation, by which the eyes, noſe, or antrum maxillare, is apt to be injured, ſhould be prevented. When matter collects in the antrum, it is to be removed by the methods formerly deſcribed.

For replacing fractures of the *lower jaw*, the patient ſhould be ſeated in a proper light, with his head firmly ſecured. The ſurgeon ſhould preſs with one hand on the inſide of the bone, while with the other he guards againſt inequalities on the outſide. If a tooth come in the way, it ſhould be extracted; when any of the others are forced out of their ſockets, they ſhould be replaced, and tied to the neighbouring teeth till they become firm. The fractured parts being kept firm by an aſſiſtant, a thick compreſs of linen or cotton ſhould be laid over the chin, and made to extend from ear to ear over it; a four-headed roller ſhould be applied firm enough to keep the fractured parts in contact. The patient ſhould be kept quiet during the cure, and fed upon ſpoon-meat. The dreſſings ſhould be removed as ſeldom as poſſible. When the fracture is accompanied with an external wound, the parts ſhould be ſupported by an aſſiſtant during the dreſſing of it.

SECT. III. FRACTURES *of the* CLAVICLE, RIBS, STERNUM, *and* SPINE.

A fracture of *the clavicle* is eaſily diſcovered by the grating noiſe in the fractured bone upon moving the arm freely, by the ends of the bone yielding to preſſure, and by the motion of the humerus being impeded. All that can be done is to raiſe the arm, and ſupport it at a proper height, either by a ſling, or, which is better, by the leather caſe recommended in caſe of luxation of this bone. By this the fractured parts will be brought together, ſo far at leaſt as to prevent deformity, and render the bone ſufficiently ſtrong.

Fractures of *the ribs* are diſcovered by preſſure with the fingers. The ſymptoms are commonly moderate, and the patient ſoon gets well. In ſome caſes, however, the pain is ſevere, the breathing becomes difficult, attended with cough, and perhaps with ſpitting of blood, and the pulſe is quick, full, and ſometimes oppreſſed. Theſe ſymptoms ariſe from the ribs being beat in on the lungs.

In the treatment, it is proper in every caſe to diſcharge ſome blood. If one end of the rib riſe, it ought to be repreſſed by moderate preſſure; and to prevent its riſing again, a broad leather belt ſhould be applied pretty tight, and continued for ſome weeks. When a portion of the rib is forced inwards, an opening ſhould be made over it with a ſcalpel, and then it ſhould be elevated with the fingers or a forceps. When diſtreſſing ſymptoms proceed from air or blood collected in the cavity of the cheſt, theſe fluids ought to be diſcharged by an operation.

The ſymptoms of a fractured *ſternum* are nearly the ſame with thoſe of the ribs. It requires great attention, from the vicinity of the heart and large blood-veſſels. The patient ought to loſe a quantity of blood, and be kept on an antiphlogiſtic regimen. If the pain, cough, and oppreſſed breathing, do not yield to theſe remedies, an inciſion ſhould be made on the injured part, and the depreſſed piece raiſed with a levator. Should this be inſufficient, it may be effected by means of the trepan: this, indeed, requires the greateſt caution; but it may certainly be attended with advantage when the patient's life is in danger.

Fractures of *the vertebræ* generally end fatally. We judge of the exiſtence of fracture there by examining the parts, by the ſeverity of the pain, and by palſy occurring in the parts ſituated below the injured part.

When any parts of the vertebræ near the integuments are looſe, they may be replaced with the fingers, and retained by proper bandages. When this is impoſſible, ſome of the lateſt authors think it adviſable to make an inciſion, and raiſe any portions of the bone which may be depreſſed.

SECT. IV. FRACTURES *of the* BONES *of the* SUPERIOR EXTREMITIES.

The *ſcapula* is ſeldom fractured; when it is, the fracture is eaſily diſcovered by the pain, the immobility of the arm, and by the touch. The parts may be replaced with greater eaſe if the muſcles connected with them be relaxed. They are retained with difficulty. A long roller ſhould be employed for this purpoſe, with which the head and ſhoulders are alſo to be ſupported. The arm ſhould alſo be ſuſpended, to relax the muſcles as much as poſſible, and inflammation particularly guarded againſt by local bleeding.

Fractures of *the humerus* are eaſily diſcovered by the pain, the immobility of the arm, and a grating noiſe on handling the parts. In reducing the fracture, the muſcles ſhould be completely relaxed, by bending the arm and raiſing it to a horizontal poſture. Extenſion, if neceſſary, may be made by one aſſiſtant graſping the arm between the fracture and the ſhoulder, and another between the fracture and the elbow. After the reduction, one ſplint covered with flannel ſhould be laid along the whole outſide, and another along the whole inſide of the arm; and then a flannel roller applied ſufficiently tight to ſupport the parts without interrupting the circulation. The arm may either be ſupported in a ſling, or Mr. Park's leather caſe (fig. 84). The bandages ſhould not be removed for ſeveral days, unleſs ſome urgent ſymptoms render it neceſſary. In about a week, however, the arm ſhould be examined to ſee whether the bones have been properly reduced.

When both of the bones of *the fore-arm* are broken, the fracture is eaſily diſcovered; but when only one bone is fractured, eſpecially if it be the radius, the firmneſs of the other renders the diſcovery more difficult: the grating noiſe, however, on moving the bone in different directions, will generally be a ſufficient ſymptom that a fracture has taken place. When the fracture happens near the wriſt, particular attention is neceſſary in order to prevent a ſtiff joint. In order to replace the parts, the muſcles are to be relaxed by bending the joints of the elbow and wriſt, and the limb extended a little above and below the fracture. After reduction, a ſplint, reaching from the elbow to the ends of the fingers, is to be applied along the radius, and another along the ulna; and both are to be ſecured with a roller, or twelve-tailed bandage. When the ſplints are applied, the palms ſhould be turned towards the breaſt as the moſt convenient poſture. The arm ſhould be hung in a ſling. A partial diſlocation of the bones of the wriſt ſometimes attends a fracture of the radius, by which a ſtiff joint, under the beſt practice, is apt to enſue, or permanent painful ſwellings of the fore-arm. In ſuch caſes, the patient ought to be warned of the danger, that no blame may be afterwards incurred.

When *the olecranum* is fractured, the arm muſt be kept in an extended ſtate during the cure, by applying a ſplint oppoſite to the joint of the elbow, reaching from the middle of the humerus to the points of the fingers. The arm ſhould be hung by the patient's ſide, to which it ſhould be fixed by means of ſtraps. To prevent the conſequences of a ſtiff joint, the dreſſings ſhould be removed about the eighth or tenth day, the fore-arm for ſome time ſlowly moved backwards and forwards, and the joint rubbed with an emollient oil. By a repetition of this at proper intervals, a ſtiff joint may be prevented.

Anchyloſis, or ſtiffneſs of the joint, commonly ſucceeds fractures of the bones of *the wriſt*, owing to the great inflammation which enſues, and to their not readily re-uniting from their ſmallneſs. To prevent this as much as poſſible, after replacing the bones, the injured parts ſhould be leeched freely, and in proportion to the violence of the ſymptoms. Splints ſhould be applied exactly as in fractures of the fore-arm, and the arm ſupported by a ſling.

In fractures of *the metacarpal bones*, a firm ſplint ſhould be applied over the whole palm and inſide of the arm, from the points of the fingers to the elbow, in order to prevent the action of the flexors of the fingers. The beſt ſplint for a fractured finger is a piece of firm paſteboard properly fitted and ſoftened in water till it can be readily moulded into the form of the part. This ſhould be applied along the whole length of the finger, and ſecured with a narrow roller. At the ſame time, a large roller ſhould be applied over the inſide of the hand to prevent the parts from being moved. To prevent ſtiffneſs, the dreſſings ſhould be removed about the end of the ſecond week, and the joint cautiouſly bent; and this ſhould be repeated daily till the cure be completed.

SECT. V. FRACTURES *of the* BONES *of the* INFERIOR EXTREMITIES.

Fractures of the body of *the thigh-bone* are readily diſcovered by the grating noiſe when the ends of the bones are forcibly rubbed together, by the ſhortneſs of the limb if the fracture be oblique, and by the limb being unable to ſuſtain the body. But fractures of the neck of the bone are often not eaſily diſtinguiſhed from diſlocation of the joint. In general they may be diſtinguiſhed by the circumſtances mentioned in treating of luxations of this bone. In forming a prognoſis, we ought to conſider that no fractures are more apt to diſappoint our expectations than thoſe of the thigh, eſpecially when the neck of the bone is broken, owing to the difficulty of diſcovering the place of the fracture, and of retaining the bones even after they have been replaced. In order to reduce fractures of the thigh, the muſcles are to be relaxed by moderately bending the joints of the thigh and knee: when this is done, unleſs there be much pain and tenſion, the bones are eaſily replaced by one aſſiſtant holding the upper part of the thigh, while another ſupports and gently pulls down its lower extremity, while the ſurgeon is employed in adjuſting the fractured pieces. It is more difficult to reduce fractures of the neck of the bone, on account of the great ſtrength and various directions of the ſurrounding muſcles. In general, however, we ſhall ſucceed by moderate extenſion, if we take care previouſly to relax all the muſcles as much as poſſible: if we do not ſucceed, we muſt have recourſe to machinery.

The greateſt difficulty is to retain the bones in their ſituation after they are replaced. The limb muſt be firmly ſecured by ſplints made of thin ſlips of wood glued to leather, or of thick paſteboard. One ſplint, broad enough to cover half of the thigh, ſhould reach from the top of the hip joint to a little below the knee, and another, covering about a third part of the thigh, from the groin to a little below the knee. The ſplints ſhould be lined with flannel. They are to be ſecured by a twelve-tailed bandage, and over all a thin pillow ſhould be put nearly as long as the thigh. The ſplints and bandages may be put on in the following manner: the patient being placed on a firm hair mattreſs, with his knee moderately bent, the long ſplint, bandage and pillow are to be applied to the outſide of the thigh, and the patient ſhould be turned ſomewhat towards the affected ſide, with the knee and leg raiſed a little higher than the body; the ſhort ſplint ſhould then be applied along the inſide of the thigh, and the bandage already placed without the other ſplint, applied ſo tight as to make an equal moderate preſſure over the whole: (ſee Plate III. fig. 85.) To make the part ſtill more ſecure, it is proper to inſert a long firm ſplint of wood under the middle of the pillow, and to fix it by two broad ſtraps to the upper part of the limb. To prevent the limb from being affected by involuntary ſtartings, the pillow ſhould be fixed to the bed by ſtraps: to keep off the weight of the bed-clothes, a cradle with hoops ſhould be placed over the thigh. The parts ſhould be examined after ſome time to ſee that the bones be not diſplaced. When there is pain, ſwelling, and inflammation, leeches and other remedies ſhould be applied. To render the ſituation of the patient as eaſy as poſſible during the cure, he may be allowed after the ſecond week to turn a little more towards his back, and at the ſame time to extend the joint of the knee in a ſmall degree: after this time a little flexion and extenſion of the limb may be daily repeated to preſerve the uſe of the joint.

The method here deſcribed generally ſucceeds. Sometimes, however, notwithſtanding all our care, the ends of the bone ſlip over each other. To prevent the deformity which this occaſions, it has been attempted to make extenſion and counter-extenſion by machines: but the pain and irritation have always been ſo great that little advantage has yet been derived from ſuch means. The invention (fig. 86) of the late Mr. Gooch, of Norwich, improved by the late Dr. Aitken, of Edinburgh, has been recommended as one of the beſt machines for oblique fractures of the thigh. After endeavouring to remove the pain, ſwelling, and inflammation, which are ſometimes ſo great as to preclude the application of the ſimpleſt bandage, this machine may be tried. But if it be found impracticable to uſe it, the cure muſt be conducted in the uſual way, with the chance of the fractured pieces overlapping one another, and of courſe the limb being ſomewhat ſhortened.

The *patella* is moſt frequently fractured tranſverſely, ſometimes lengthwiſe, and ſometimes into ſeveral pieces. Fractures of this bone have been ſaid commonly to end in a ſtiff joint; but this is perhaps moſt frequently owing to the limb being kept too long in an extended poſture. In the treatment of fractures of this bone, the leg ſhould be extended, to relax as much as poſſible the ſoft parts connected with the bone. The patient ſhould be placed on a firm mattreſs, and a ſplint be placed under the limb long enough to reach from the top of the thigh to the under part of the leg, to which the limb ſhould be fixed by a number of ſtraps to keep it in a ſtate of extenſion. The fractured bones are then to be brought together, and ſuch a number of leeches applied to the joint as will remove as much blood as the patient can bear; and as long as much pain and tenſion continue, ſaturnine and other aſtringents are to be uſed for removing them. When this is accompliſhed, and the parts properly adjuſted, a large pledget of Goulard's cerate ſhould be laid over the joint, and a hooped frame employed to keep off the bed-clothes. In a longitudinal fracture, the parts are eaſily kept together by a common uniting bandage or adheſive plaſter: but in tranverſe fractures more force is neceſſary. Various bandages have been employed for drawing the pieces together in ſuch fractures; one of the beſt of theſe is that repreſented fig. 87. We need not be anxious, however, about bringing the pieces very cloſe together, as a cure may be made though they remain at a conſiderable diſtance. The bandages, unleſs particular ſymptoms occur, ſhould not be removed till the end of the ſecond week; after which the joint ſhould be cautiouſly bent, every ſecond day, to prevent ſtiffneſs.

The *leg* is commonly fractured near the lower end, this being the weakeſt part of the bones. In the treatment of a fractured leg the ſame rules apply which were given for a fractured thigh-bone. The muſcles ſhould be relaxed by bending the knee; but little advantage can be derived from bending the foot, for in proportion as the muſcles behind are relaxed, thoſe before are put on ſtretch: the patient may be therefore allowed to keep the foot in the eaſieſt poſture. The bones are commonly replaced by the gentle extenſion of the upper part of the limb by an aſſiſtant, while another ſupports it at the ankle. The bones being replaced, and the limb laid on its outſide with the knee bent, two ſplints (fig. 88) are to be applied, long enough to reach from the upper part of the knee to the edge of the ſole, ſo as to prevent the motion both of the knee and ankle. The ſplints are to be retained by a twelve-tailed bandage, as in the caſe of fractured thigh-bone. See fig. 85.

If the patient be either very reſtleſs or troubled with ſpaſmodic affections of the muſcles of the leg, an additional ſplint, ſhaped to the form of the leg, ſhould be applied along the outſide of it, and fixed by a ſtrap at the upper, and another at the under, part of the leg. When the patient cannot reſt when lying on either ſide, he may be placed on his back, and the curved ſtate of the knee ſtill preſerved by raiſing the leg a little above the level of the body on a frame made for the purpoſe. This variety of poſture may likewiſe be uſed in fractures of the thigh. The patient may from the firſt be laid in this poſture, or he may alternately change from the one to the other. No change of poſture, however, ſhould be allowed for the firſt ten or twelve days. When the fibula only is fractured, it is apt to be conſidered as a ſprain of ſome of the muſcles; but this ought to be particularly attended to, as the miſtake may be followed by bad conſequences. When both the bones of the leg are broken, the portion next the foot is commonly drawn towards the back part of the leg, ſo that a prominency is produced by the fractured part of the upper portion of the bone; and this is improperly termed the riſing end of the fractured bone. The appearance is entirely produced by the inferior portion falling back. Hence no advantage is derived from preſſure being made on the upper end of the bone: the inferior portion ſhould be raiſed ſo as to bring the parts into contact, and then by proper bandages they ought to be ſupported till they are perfectly united.

Fractures of the bones of *the foot and toes* are treated nearly in the ſame manner as fractures of the hand and fingers. Beſides the ſplint which may be neceſſary for the particular part, a large one ſhould be applied over the ſole; nor ſhould any motion be allowed for a conſiderable time either in the foot or ankle, otherwiſe the bones may be diſplaced, and a proper cure prevented.

SECT. VI. *Of* COMPOUND FRACTURES.

By compound fracture is now generally meant a fracture of a bone communicating with an external wound in the integuments. They are much more dangerous than ſimple fractures. The generality of authors have conſidered amputation as indiſpenſable in caſes of compound fracture; while a few, particularly Mr. Bilguer, ſurgeon-general to the armies of the late king of Pruſſia, affirm that it is ſcarcely ever neceſſary. Both ſeem to have carried matters too far. Some of the lateſt and beſt ſurgeons have recommended never to amputate immediately in private practice, unleſs when the bones are ſo much ſhattered that they cannot reunite, or the texture of the ſoft parts is completely deſtroyed; becauſe, even if amputation be at laſt neceſſary, the patient will have a greater chance of recovering than if it had been performed immediately after the accident: for the ſtate of weakneſs to which he is generally reduced, renders the attendant ſymptoms leſs violent. On the other hand, it has been conſidered as no bad rule in the army or navy, where patients cannot be kept in a proper ſituation, and where ſufficient attention cannot be given, to amputate immediately in caſes of compound fractures of the large bones of the extremities. When amputation is not performed immediately, it is not, for ſeveral days at leaſt, admiſſible. It may afterwards be rendered neceſſary by hemorrhages, which cannot be ſtopped but by means more dangerous than amputation itſelf; by extenſive mortification; or by the ends of the fractured bones remaining long diſunited, while a great diſcharge of matter endangers the patient's life.

In *treating compound fractures*, all extraneous bodies ſhould be removed, as alſo all thoſe ſmall pieces of bone which will probably not unite with the reſt. For this purpoſe the opening, if neceſſary, ſhould be enlarged with a ſcalpel. The next ſtep is to replace the bones by relaxing the muſcles as in ſimple fractures. Sometimes part of a bone projects ſo far through the integuments, that it cannot be replaced without either ſawing off the end of it, or enlarging the wound. If the fractured bone be long, ſharp, and projecting much, it is beſt to ſaw it off; for though it were reduced, it would not readily reunite, and it would be apt to excite much pain and inflammation. But if it be broad at the baſe, and of no great length, it ought certainly to be ſawed, even though it cannot be reduced without enlarging the wound. For the moſt part, it is only the ſkin which it is neceſſary to cut; but even the muſcles ought to be divided, though as much as poſſible in the direction of their fibres, when the bone cannot otherwiſe be replaced. After the reduction, a pledget of ſome emollient ointment is to be laid over the wound, and the limb placed on a firm ſplint, and ſtill kept in a relaxed poſture. In dreſſing the wound, the limb ought not to be moved: the many-tailed bandage, therefore, ſhould be uſed rather than a roller. Various contrivances have been fallen upon to allow the limb to be at reſt while the ſurgeon is dreſſing it. The fracture-box, invented by the late Mr. Rae, ſurgeon in Edinburgh, is one of the beſt. When the leg is laid on this, it may be dreſſed with tolerable facility without moving it. We are happy to have it in our power to announce to the gentlemen of the medical faculty, that another machine has lately been invented by Mr. Samuel James, ſurgeon in Huddeſden, Herts, which will yet more effectually relax the muſcles, and retain the bones in their natural ſituation, without pain to the patient, or the leaſt inconvenience to the operator. See fig. 89, Plate III.

It is of the greateſt importance to prevent inflammation, which is apt either to produce mortification, or to give riſe to extenſive abſceſſes. The dreſſings ſhould be removed once or twice daily, according to the quantity of matter. The common application of warm poultices, on account of their inconvenience, may be deferred till they become neceſſary by the approach of inflammation, which they are to be conſidered as the ſureſt means of preventing by exciting a diſcharge of matter. Whenever the inflammation ſubſides, and a free diſcharge of pus is produced, the poultices ought to be laid aſide, leſt they do harm by relaxing the parts too much, and exciting too copious a diſcharge. The ſore ought then to be dreſſed with mild aſtringents, and the patient kept on a nouriſhing diet with tonic medicines. A free paſſage ſhould be given to the matter, by putting the limb in a favourable poſture, and by making a counter opening, if neceſſary, in the moſt depending part. But this may be frequently avoided by covering the ſore with ſoft lint or ſponge to abſorb the matter. If the diſcharge become exceſſive, and cannot be leſſened by the means above mentioned, it will be found to proceed from a portion of looſe bone which has not been earlier noticed, by the removal of which it may be ſtopt. If inſtead of producing matter, the inflammation terminate in gangrene, the danger is ſtill greater, than under the moſt extenſive abſceſſes. For the treatment of this, the reader is referred to vol. III. p. 219.

We ſhall conclude this ſection with the following account of a "ſucceſsful mode of preventing gangrene in compound fractures," communicated by Mr. John Crowther, of Halifax, to the Medical and Phyſical Journal:

"It may be proper to premiſe this account of the manner of treating compound fractures (ſays Mr. Crowther, who ſpeaks in behalf of himſelf and Meſſrs. W. and R. Crowther, practitioners in the Weſt Riding of Yorkſhire), by obſerving, that the method now recommended has been practiſed, with the greateſt ſucceſs, by our anceſtors, in Eland, near Halifax, time immemorial, being handed down from father to ſon.

"When we are called to a patient who has ſuffered a compound fracture (of the leg for example), we firſt endeavour, as expeditiouſly as poſſible, to clear the wound of all extraneous bodies, and then put the limb by a gentle extenſion into a good poſition, the knee being kept at the ſame time moderately bent, to favour the relaxation of the muſcles of the fractured limb. While this is performing, we order a large quantity of black baſilicon ointment, made with tar inſtead of pitch, to be liquefied in an iron or earthen pan, and made hot, and then put into it, with all diſpatch, a large pledget of tow, ſufficient if poſſible to cover the whole wound, ſo as totally to exclude all external air. If one pledget be not ſufficient to cover all the lacerated parts, then another muſt be applied. Our manner is generally to ſpread out the tow take hold of each end, dip the middle part into the hot ointment, then lift it out and apply it directly to the wounded part. The leg being raiſed and kept in a proper poſition, as ſaid above, a roller about two inches broad is applied in ſuch a manner as to give liberty to the future ſwelling of the limb. The roller, before its application, is always moiſtened in alegar or vinegar (we generally uſe the former), with a ſolution of ſacch. ſatur. in it, in the proportion of about half an ounce to a pint of the liquid. We begin at the foot, and roll upwards as high as, or above, the knee, rather tight at the ankle, if the fracture be not there, but always gentle wherever the fracture is, taking care at the ſame time that the great toe is in a line with the patella, and the ſole of the foot nearly ſquare with the heel; the latter rule is intended to prevent a retraction of the heel, which would hinder the patient after the cure from ſtepping fairly and even upon the ground, when he at firſt attempts to walk. Upon this roller we apply paſteboards, cut broad at the top and narrow at the bottom, of the length of the leg, and three or four in number, as occaſion may require. Theſe are to be ſoaked well in warm water, and faſtened cloſe to the limb by another roller (not applied very tight) of the ſame breadth as the former, and moiſtened in the like manner. The paſteboard is moiſtened that it may, when dry, take the ſhape of the limb, and be more eaſily and expeditiouſly applied at the next dreſſing. Then come the ſplints, one of which is to be large, and always put underneath the leg, ſo as to reach down from the bend of the knee to below the heel, and to keep the inferior fractured parts from ſinking, and thereby prevent a prominence of the ſuperior parts of the bones. The ſplints are always lined with ſoft linen, tow, &c. to fill up all the cavities of the limb, and lie eaſy; and this lining is faſtened to the ſplints, that they may always come off together, and thus expedite the dreſſing. And particular care is always taken that a large ſoft compreſs or pad be placed underneath the heel, leſt it ſhould heat and inflame, and become intolerably painful. And, laſtly, we place the limb upon a pillow, and tie it up with three or four pieces of tape at equal diſtances, faſtened with bow knots, to be the more eaſily looſened. If the patient be tolerably eaſy, we do not take off the dreſſings for one, two, or ſometimes three days; but if otherwiſe, we inſpect the wound the following day, to examine the cauſe, and remove it. The ſecond dreſſing is made in the ſame manner as the firſt, with this difference, that the ointment is not applied quite ſo hot, nor the bandage ſo looſe as before, unleſs inflammation, or other circumſtances, ſhould indicate the propriety of a contrary treatment. Upon the third dreſſing the ointment is applied ſtill cooler, and ſo on; but always continued as a warm dreſſing, until there be a free and laudable purulent diſcharge; which being once accompliſhed, the ointment is uſed quite cool to the end of the cure, unleſs ſome contra-indication ſhould ariſe, ſuch as proud fleſh, &c. The ſame moiſt bandages, and their manner of application, are generally continued until the inflammation of the limb abates, and then they are uſed in a dry ſtate. In about a week or ten days we commonly begin to be more circumſpect at every dreſſing in ſhaping the limb, by making greater extenſions, bringing the fractured parts of the bones more into contact, cloſing the lips of the wound, &c. for, before this time, we are under no great apprehenſion of any little irregularity in the coaptation of the ends of the bones. Indeed, for ſome time after this period, we compare the callus to ſoft glue, which we can ſhape and mould nearly as we pleaſe; and for this reaſon we do not diſturb the fracture too much by extenſions, &c. at the firſt, while the parts are in an inflamed and irritable ſtate. The perfect formation of the callus, and union of the bones of the fractured leg of the adult, of a middle age, we generally find to take place in about twenty-five days, provided there be no loſs of bone. And what is remarkable, we have ſometimes known, in ſimple fractures, the callus to ſtiffen and unite very ſuddenly; for inſtance, the limb has been ſomewhat flexible at the fractured part the preceding day, and ſtiff the next.

"We always examine the pulſe at every viſit, and form a particular judgment by it; if it be full and ſtrong, and not very quick, as from 70 to 90 in a minute, we augur well of the patient; but if it be quick and weak we eſteem it a bad ſign. In the beginning we prefer coſtiveneſs to an open body, and wiſh it to remain ſo for the firſt week or ten days, as we think that it keeps up the patient's ſtrength, and produces a vigorous circulation in the veſſels and lacerated parts, which it is our endeavour to promote; and has alſo this further advantage, that the limb is in no danger, in the early ſtage of the cure, of being diſturbed and ſhaken by the preparation neceſſary for an alvine diſcharge. In compound fractures there is uſually a great loſs of blood; but if this ſhould not be the caſe, and there come on much ſwelling and inflammation, with a full ſtrong pulſe (which in our practice rarely happens), we do not heſitate to bleed freely, and give ſaline cathartics, ſuch as ſal. Glauber. &c. and, if neceſſary, apply leeches to the tumefied parts, and fomentations, and cataplaſms of oatmeal and grounds of beer boiled together, but always the ointment before mentioned upon the wounded parts. We recommend it to our patients to ſit up in bed every day, conceiving it to be a great means of both promoting digeſtion and preſerving the ſtrength, and far preferable to their being confined in a ſupine poſture for ſuch a length of time. The patients are generally kept to their uſual diet, but we forbid beer, wine, and all ſpirituous liquors for drink, unleſs they have been much accuſtomed to any of them, and then allow a moderate quantity. For common beverage we prefer tea, barley-water, and milk. But if the wounded perſon be of a cold phlegmatic conſtitution, and the pulſe weak, we give Peruvian bark liberally, and allow a more generous diet and ſome wine, with the intention of ſtrengthening the habit, and keeping up the circulation in the wounded and lacerated parts; for we fear nothing more than a pale and ſallow complexion, a weak quick pulſe, and defect of a glowing febrile warmth.

"As we live in a part of the country which abounds with coal mines and ſtone quarries, and is full of manufacturers, many of whom are employed in the direction of dangerous machines worked by ſteam-engines, we are frequently called upon to attend very ſerious accidents. From the 28th of April, 1798, to the 5th of October, 1800, not fewer than ninety-eight fractures have fallen to my ſhare, twenty-eight of which were fractures complicated with a wound; but which were never followed by any gangrenous appearances."

Mr. Crowther ſays the ſame ſucceſs has attended the practice of his two brothers for many years.

CHAP. XXXV. OF AMPUTATION.

SECT. I. *Of* AMPUTATION *in general.*

In amputation, which in ſurgery ſignifies cutting off a limb, the great end to be aimed at is, the procuring of a handſome ſtump, in which the bone may not protrude, but be well covered with fleſh; ſo that no excoriation or rawneſs may be apt to take place. As long ago as the year 1579, it was propoſed by Jacob Young, an Engliſh ſurgeon, in a treatiſe entitled *Currus Triumphalis ex Terebinthino*, to preſerve a flap of fleſh and ſkin, which was to be folded over the bone, and which, uniting to the parts of the wound after amputation, would effectually cover the bone, and prevent the inconveniences above mentioned. No traces of the ſucceſs of this method, however, can be found till the year 1626; when a Latin diſſertation was publiſhed upon it by P. Adrian Verduin, an eminent ſurgeon in Amſterdam. The moſt ſanguine expectations were formed of its ſucceſs; and it was even thought that the flap would prevent the neceſſity of tying up the blood-veſſels. However, it does not appear that the method as at that time practiſed either did or could ſucceed; and accordingly it was entirely laid aſide; but it has been ſince revived with conſiderable improvements by Mr. Alanſon of Liverpool.

Amputations may be rendered *neceſſary* when a member is ſo much diſeaſed as to be uſeleſs, or when it puts life in danger.

The cauſes in general rendering this operation neceſſary are, bad compound fractures; extenſive lacerated and contuſed wounds; part of the limb carried off by a cannon ball or otherwiſe, the bones being unequally broken and not properly covered; extenſive mortification; white ſwellings of the joints; large exoſtoſes; ulcers attended with extenſive caries; cancer or other incurable ulcers; varicoſe kinds of tumors; particular diſtortions of the bones.

Amputations may alſo be ſometimes neceſſary from violent hemorrhage of ſome principal artery during the cure of a fractured limb, or from ſuch a profuſe diſcharge of matter taking place that the ſtrength of the patient is exhauſted. Lacerated and contuſed wounds may require amputation, on account of hemorrhage enſuing which cannot be ſtopped. Extenſive mortification may take place and ſuch large quantities of matter be formed, that the patient will not be able to bear up under the diſcharge.

Where part of the limb is carried off, it is neceſſary to amputate higher up, ſo as to cut the bone, as well as the ſoft parts, in ſuch a manner as may admit of a much ſpeedier and ſafer cure. When mortification occurs, every thing ought to be done for the ſupport of the patient till the diſeaſe be ſtopped; the firſt ſign of which is, the appearance of an inflamed circle between the diſeaſed and ſound parts. As ſoon as the diſeaſed begin to ſeparate from the ſound parts, amputation of the limb ought to be performed, and no time ought now to be loſt, leſt the patient ſuffer from the abſorption of putreſcent matter.

No part of ſurgery is brought to greater perfection than the manner of performing amputation. Before the invention of the tourniquet, and the method of ſecuring the veſſels by ligature, the operation was ſeldom undertaken; and a great proportion of thoſe upon whom it was performed died ſoon after. In the preſent improved method one death does not happen in twenty, or even thirty caſes. In performing the operation, particular attention is to be paid to the ſpot where the inciſion is to be made; the quantity of ſkin and cellular ſubſtance neceſſary to be ſaved, ſo as to cover the muſcles and bone completely, without being ſtretched; cutting the muſcles in ſuch a manner that they may unite with each other and entirely cover the end of the bone; the prevention of hemorrhages during the operation; the tying of the arteries alone, without including the nerves or any of the contiguous parts; ſecuring the integuments ſo as to prevent them from retracting after the operation; and a proper ſubſequent treatment of the caſe.

The following are the *general ſteps of the operation:* The patient being properly placed, with aſſiſtants to attend, and the apparatus in proper order, the flow of the blood to the limb is to be ſtopped by the tourniquet (fig. 10.) The firſt inciſion is to be made through the ſkin and cellular ſubſtance by one, or rather by two, ſtrokes of the amputating knife repreſented in Plate IV. fig. 95. Theſe are next to be ſeparated from the muſcles, as far as may appear ſufficient for covering the ſtump. The ſeparated ſkin or flap ſhould be ſtrongly drawn up, or what perhaps anſwers better, turned up all round the limb, leaving this part of the muſcles quite bare. The flap is to be kept in this ſituation by an aſſiſtant, while the operator makes the next inciſion at the edge of the reflected ſkin, and cuts till he comes to the bone. This inciſion ſhould be begun on the lower ſide of the limb, that the blood may not prevent the eye from readily following the edge of the knife during the whole cut. The muſcles are now to be ſeparated from the bone as high as may enable them afterwards completely to cover it. The ſoft parts in general are then to be drawn up by retractors, which may be either of leather, as in fig 96, or metal, as in fig. 97. The perioſteum is to be divided at the place where the ſaw is to be applied; but no part of the bone is to be denuded of this membrane, which is afterwards to cover the ſtump, otherwiſe troubleſome exfoliations may enſue. At this place the ſaw (fig. 98) is to be applied, and the bone divided with long ſteady ſtrokes. In this part of the operation a good deal depends upon the readineſs of the aſſiſtant who holds the limb; for if it be held too high the motion of the ſaw will be impeded; while the bone may be ſplintered if it be not ſufficiently raiſed. Any points or ſplinters which may be left ſhould be immediately removed with the pincers (fig. 99). The retractors are now to be laid aſide, and the principal arteries ſeparated from the nerves, and ſecured by the tenaculum (fig. 11), or forceps (fig. 103), and ligatures.

The tourniquet ſhould next be a little ſlackened, to allow the different branches to be diſcovered; the clotted blood is to be cleared away with a warm ſponge. The patient ſhould have ſome warm cordial drink, and all the arterial branches which can be diſcovered ought to be taken up. The ends of the ligatures are then to be cut of ſuch a length as to allow them to hang without the lips of the wound. The muſcles and ſkin are now to be drawn down, and brought into cloſe contact, that the ſtump may be completely covered. The parts are next to be ſecured by proper bandaging; and if the operation has been properly performed, the cure will commonly be made by the firſt intention, and may be completed in the courſe of three or four weeks, and ſometimes in a ſhorter period. This however muſt depend much upon the conſtitution of the patient, as well as the manner of performing the operation.

SECT. II. *Of* AMPUTATING *the* ARM *and* FORE-ARM.

Amputation of the arm is performed according to the rules already laid down. No more of it ſhould be removed than is diſeaſed; for the longer the ſtump is, the more uſeful it proves. The tourniquet is to be applied a little above the part where the operation is to be performed: as much of the integuments ſhould be ſaved as may be perfectly ſufficient for covering the ſore. In taking up the artery, after the bone has been divided, the operator ought to be attentive not to include the radial nerve, which may be readily diſcovered and ſeparated, as it lies cloſe upon the fore part of the artery. The fore-arm is to be amputated nearly in the ſame manner as the leg; only that the ſtump may be covered by amputating with the double inciſion, without the aſſiſtance of a flap, which it is neceſſary to form in the leg.

In the Medical and Phyſical Journal, there appears the following account of an uncommon occurrence after amputation of the arm, by Mr. Rowlands, of Cheſter:

"On September the 9th, 1794, Robert Jones, a collier, was drawn up with great velocity out of a pit, forty yards deep, by the fore arm, which was nearly ſeparated from the elbow, by being drawn between the rope and the wheel. The accident happened early in the morning; and a ſurgeon in the neighbourhood applied a tourniquet about four inches below the ſhoulder. He was brought to the infirmary about ſix in the evening, and his arm immediately amputated above the ligature, which had been tight on all day. The man bore a journey of ten miles in a cart, with his arm in that ſhattered condition, and ſuſtained the operation without either fainting or complaining; he took an opiate, and had a better night than could have been expected.

"The next day a clyſter was adminiſtered, and he took ſaline draughts, with fifteen drops of vin. ant. in each, to remove a ſlight degree of fever: he continued the opiate every night. On the 13th, I looked at the ſtump," ſays Mr. Rowlands, "and had the ſatisfaction to find it perfectly united in every part, but where the ſingle ligature hung out, only one artery having appeared. On the 22d the ligature ſeparated; and on the 25th, all dreſſings, except a little lint and the roller, were left off.

"The man had walked about the ward for many days, his appetite being good, and his nights undiſturbed.—On the 27th, about three in the morning, I was deſired to come to him immediately, the meſſenger at the ſame time informing me that he was bleeding to death.—I haſtened to him, and found the poor man in a miſerable condition. The tourniquet had been applied by Mr. Manning, the houſe apothecary; but as the hæmorrhage came on in the middle of the night, he had loſt ſo much blood before a diſcovery was made, that the bed was wet through, and the blood flowed acroſs the ward. After removing the bloody things from about the ſtump, I diſcovered the cauſe of this extraordinary accident, to be an extenſive mortification of the artery and integuments covering it. The union of the ſtump continued complete; the ſkin having ſeparated in a ſlough, about an inch from the edge of the cicatrix. I made a ligature on the artery, and doſſils of lint were applied to the mouth of it. The wound was dreſſed with mild digeſtive; every means had been uſed, and were ſtill continued, to recover him from the low, fainting ſtate to which he was reduced; and a perſon was directed to watch him conſtantly, and to make a ſlight compreſſion on the end of the veſſel. 28th, No appearance of blood. 29th, In the night, a ſecond ſloughing of the artery took place, and the ligature came off. The tourniquet was tightened as expeditiouſly as poſſible; but ſo great was the loſs of blood, that in his reduced ſtate it had nearly deſtroyed him. As ſoon as he was a little recovered, I made an inciſion in the direction of the artery to the axilla, and put a ligature on the veſſel, as high up as poſſible. The wound was dreſſed as before; and moderate preſſure was continued by a careful aſſiſtant. Nothing further occurred worthy of obſervation; the wound healed ſlowly, but eventually ſo as to leave a very good ſtump; and he was diſcharged from the infirmary in good health on the 28th of November following."

SECT. III. *Of* AMPUTATING *the* THIGH.

In performing this amputation, the patient ought to be placed upon a table of ordinary height; with the diſeaſed limb ſupported and ſecured by an aſſiſtant ſeated before him, while other aſſiſtants take care of the other leg and the arms. The courſe of the blood is to be ſtopped by applying the tourniquet over the trunk of the femoral artery, near the upper part of the thigh. No more of the thigh ought to be removed than is rendered neceſſary by the diſeaſe, as the more of it is left, the more uſeful it will be to the patient. An aſſiſtant ſhould graſp the limbs with both hands a little above the place where the ſkin is to be divided, and draw it up as far as poſſible; while the operator, ſtanding on the outſide of the limb, makes a circular inciſion down to the muſcles, by one or two ſtrokes of the knife. As much of the integuments is then to be diſſected with a ſcalpel from the muſcles as may cover the ſtump completely; and this part of the ſkin may either be turned back, or drawn lightly up by an aſſiſtant. The muſcles may then be divided quite acroſs to the bone by the edge of the ſkin, in the common way, or cut obliquely upwards, according to the method of Allanſon, ſo as to lay the bone bare two or three fingers breadth higher than is done in the common way. The muſcles are next to be ſeparated from the bone with a ſcalpel a little way, that a ſufficient quantity may be left for covering the end of it. The reſt of the operation is to be performed exactly according to the general rules laid down in the firſt ſection of this chapter. The muſcles and integuments are to be drawn over the end of the bone, and applied cloſely together, that the ſkin may completely cover the ſtump, and retained in this ſituation by an aſſiſtant till a flannel or cotton roller, according to the ſeaſon of the year, which has been previouſly put round the body, be applied in ſuch a manner as to ſupport and fix them. For this purpoſe it ſhould be paſſed two or three times, in a circular direction, round the top of the thigh, and ſhould afterwards, with ſpiral turns, be brought down near to the end of the ſtump, and faſtened with pins; and it ſhould not be tighter than may be ſufficient to aſſiſt the plaſters in preventing retraction.

The ends of the divided muſcles are now to be laid exactly over the bone; and the edges of the ſkin are to be brought into contact, either ſo as to form a ſtraight longitudinal line, according to the method of Mr. B. Bell, &c.; or they are to be placed horizontally, "that the wound may appear only in a line with the angles at each ſide," as adviſed by Allanſon. The ligatures may either hang over the edges of the wound, or be brought to the angles. After the edges of the ſkin are in this manner exactly applied to each other, either a few ſlips of adheſive plaſter are to be laid acroſs the face of the ſtump, or two large pieces of adheſive plaſter, with ſeveral pieces of tape fixed to them, are to be applied to the ſurface of the ſkin. The tapes are then to be tied with a running knot immediately over the wound; by which the parts will be kept ſo cloſely together as to prevent any collection of matter from being formed. The whole ſurface of the ſtump ſhould next be covered with a large pledget ſpread with an emollient ointment, over which a compreſs of fine tow is to be put, and retained in its place by a broad croſs ſtrap of old linen, paſſing ſome way up the thigh, ſo as to be ſecured by the roller, which is now to be paſſed two or three times round the ſtump; and the preſſure formed by the croſs ſtrap may afterwards be increaſed or diminiſhed at pleaſure, by drawing it with more or leſs tightneſs, and fixing it with pins to the roller. While the ſtump is dreſſing, the tourniquet is removed, but replaced again looſely, to enable the attendants to check any hemorrhage which may afterwards enſue.

The patient is now to be laid to reſt, and the limb is to be placed upon a little tow covered with linen, or upon a thin ſoft pillow; and to prevent the patient from involuntarily moving the limb, and to guard againſt ſpaſmodic ſtartings, which frequently happen after this operation, it may be fixed to the bed by two ſtraps. A baſket or hooped frame ought to be placed over the ſtump to protect it from the bed clothes. The patient ſhould immediately have an anodyne draught, which will generally procure eaſe through the reſt of the day. For this purpoſe, no more light ſhould be let into the room than is merely neceſſary for allowing the attendants to pay attention to the ſtump. As hemorrhages ſometimes occur ſeveral hours after the operation, the perſon who takes the charge of the patient ſhould watch this circumſtance with the greateſt attention. If there be only a ſlight oozing of blood, there is no occaſion for being alarmed; but whenever it appears to proceed from a large artery, it muſt be ſecured. The ſpaſmodic affections which frequently occur after amputation are ſeldom troubleſome, unleſs ſome nerve has been included in ſecuring the arteries; but when they do appear, laying the limb in the eaſieſt poſture, and giving opiates, are the principal means of procuring relief.

To prevent inflammation as much as poſſible, the patient is to be kept upon a ſtrict antiphlogiſtic regimen, and his bowels kept open by laxative clyſters, till the inflammatory ſtage is over, which will generally be in a few days. If, notwithſtanding this treatment, the ſtump ſwells, and the patient complain of pain and tightneſs, we ought to endeavour to diſcover from what cauſe the uneaſineſs originates. If it be owing to the ſtraps being too tightly fixed, they muſt be ſlackened. If the ſtump be found much ſwelled, a cooling ſolution ſhould be applied by means of ſeveral folds of linen; and, if the patient be young and plethoric, he ought to loſe a few ounces of blood from the arm; but if he be weak and emaciated, a different mode of treatment muſt be followed.

At the end of the third, or fourth day at fartheſt, the ſtump ſhould be examined; and if it appear ſomewhat open and flaccid, the parts muſt be brought cloſer together and ſecured more firmly. After this time the dreſſing ſhould be renewed every day, or every ſecond day. In about a week after the operation the ligatures may generally be removed with eaſe; but if they do not ſeparate readily, they may be gently pulled at every dreſſing, when they will, in a ſhort time, be brought away, and the wound will be ſoon healed by the firſt intention. The roller ſhould be cleaned and renewed as often as it is found ſullied; nor ſhould it be laid entirely aſide till the end of the third or fourth week after the operation. When the roller is removed, we may depend upon the ſtraps or tapes for keeping the parts together till the cure be quite accompliſhed. When the inflammatory ſymptoms are entirely gone, no medicines ought to be given which would debilitate the patient, nor is any thing more neceſſary than to keep the bowels gently open till a complete cure be made.

SECT. IV. *Of* AMPUTATING *the* LEG.

The leg may be amputated, for a diſeaſe in the foot, at two different parts; the one a hand-breadth under the knee, the other a little above the ankle. The former makes a ſufficient ſupport for the body to reſt upon an artificial leg; but the latter does that equally well, and likewiſe preſerves the motions of the knee.

In performing the operation a little way *under the knee*, the patient is to be placed and ſecured in the ſame manner as in operating upon the thigh. The tourniquet is to be placed a little above the knee, with the cuſhion upon the artery in the ham. The ſurgeon places himſelf upon the inſide of the leg, and makes a circular inciſion through the integuments down to the muſcles. The place where the inciſion ſhould be made muſt depend upon the length of the limb; but, in general, it may be between ſix and ſeven inches under the top of the tibia in an adult, or far enough down upon the ſame limb to ſave as much integuments as will cover the ſtump. After the integuments are cut through, in the manner already directed, as much of the muſcles are to be divided by the knife as can be done by a circular inciſion; and the interoſſeous parts are to be divided by a ſcalpel or catline (fig. 100). The retractors are then to be applied, and the bone ſawed off immediately below the inſertion of the tendons of the flexor muſcles. In ſawing, the operator ought to begin upon both bones at the ſame time, that he may finiſh upon the tibia, leſt ſplinters ſhould be formed. The veſſels are next to be ſecured; the ſoft parts drawn over the bones; the adheſive plaſters and other bandages applied in the ſame manner as directed for amputating the thigh, only that here the roller need not be applied ſo high as in the former operation. Two or three turns above the knee, however, are neceſſary to prevent the dreſſings from ſlipping down.

In amputating upon *the ankle*, the operation is performed in the ſame manner as that a little below the knee; but the operator ſhould fix upon that ſpot which will leave the ſtump of ſuch a length as may be moſt convenient for being fitted with an artificial machine reſembling the other leg. Nine inches from the joint of the knee, in a leg of ordinary length, was found by Mr. Wilſon, a late ingenious artificial limb maker in Edinburgh, to be the beſt part ſuited to that purpoſe, on account of the equal preſſure it makes upon the ſurface of the leg, without making any upon the end of the tender ſtump.

A patent has lately been obtained by Mr. Potts, for a contrivance, which ſupplies a uſeful leg in caſes of amputation above the knee.

The patentee, whoſe attention was drawn to the ſubject by the loſs of his own leg, has conſtructed an artificial one, which he himſelf has worn for years, and which is poſſeſſed of the following advantages: "The knee and ankle joints," he aſſerts, "are entirely at the command of the wearer; and the appearance of their motions is ſo natural, as very nearly to conceal the loſs of the extremity: the leg is made of light materials, and indeed of ſuch as imitate both the bony and fleſhy parts. It is worn with eaſe and perfect ſafety; it does not injure the dreſs, which other artificial legs are obſerved to do. The wearer can kneel and riſe up; can ſit down and riſe up; can pull on a boot, and permit it to be drawn off by a boot-jack; he can turn the anterior part of the foot outwards and inwards; ride on horſe-back with perfect ſafety; and imitate almoſt every natural motion without any aſſiſtance of his hands."

SECT. V. *Of* AMPUTATING *at the* JOINTS *of the* EXTREMITIES.

The circumſtances moſt to be attended to in performing amputation at the joints are, firſt, to ſtop the circulation by the tourniquet; or, where that is impracticable, to take up the trunk of the artery by a ligature; to make a circular inciſion in ſuch a place as may, after the operation is over, be ſufficient to cover the wound: then a longitudinal inciſion is to be made upon the oppoſite ſides of the limb, extending from the joint to the circular cut, and as deep as the bone, by which two flaps will be formed to cover that part of the joint which remains after the operation is finiſhed. The ligaments of the joint are next to be divided, and the affected limb or part of the limb removed.

After this part of the operation, it was formerly a frequent practice to ſcrape off the remaining cartilage, to unite the parts more firmly together. But this is now found to be unneceſſary; for when the fleſh is applied properly to the bone, if it do not grow to it, the union at leaſt is ſo cloſe that it afterwards gives no inconvenience to the patient.

Any branches of arteries which may have been cut during the operation are now to be ſecured; clotted blood is to be removed; and the muſcles and the ſkin are to be brought into cloſe contact with the ends of the ligatures hanging out of the wound. The parts are to be retained by adheſive plaſters, or twiſted future, or both; and proper bandages applied, in ſuch a way, that a cure may be made by the firſt intention.

Amputating the arm at *the ſhoulder-joint* has always been conſidered as a dangerous as well as a difficult operation. It ſhould never be attempted, when the ſame purpoſe can be accompliſhed by operating lower down. But caſes occaſionally occur, where the life of the patient cannot, in any other manner, be ſaved.

Amputation may become neceſſary here in conſequence of abſceſſes of the joint; caries of the humerus reaching to the joint; compound fractures, eſpecially thoſe from gun-ſhot wounds, extending to the head of the bone; and of mortification.

In performing the operation, the patient ſhould be laid upon a table of convenient height, covered with a mattreſs. He is then to be brought as near to the edge of it as poſſible, and ſecured by aſſiſtants. The circulation of the blood in the arm is next to be ſtopped, by an aſſiſtant preſſing ſtrongly with a firm compreſs upon the ſubclavian artery where it paſſes over the firſt rib; or an inciſion may be made along the courſe of the artery, which may be ſecured after ſeparating from it the contiguous nerves. When the artery is compreſſed, it will readily be known whether the compreſſion proves effectual, by obſerving when the pulſe at the wriſt is entirely ſtopped. As ſoon as this is the caſe, a circular inciſion is to be made through the integuments, at the inſertion of the deltoid muſcle, into the humerus. An aſſiſtant then draws the ſkin a little back, and at the edge of the retracted ſkin the muſcles are to be cut in a circular direction to the bone.

If the artery has not been taken up at the beginning of the operation, it is now to be ſecured, as well as any branches which come in the way.

The amputation-knife is now to be laid aſide, and the reſt of the operation finiſhed with a ſtrong ſcalpel. A perpendicular inciſion is next to be made at a little diſtance from the outſide of the artery, beginning at the acromion, and terminating in the circular inciſion, cutting as deep as the ſurface of the bone. A ſimilar inciſion is to be made on the back part of the arm, ſo that the flaps may be of an equal breadth. The arterial branches are here to be ſecured; the flaps are to be ſeparated from the bone, guarding againſt wounding the trunk of the artery; the flaps are to be ſupported by an aſſiſtant, and the capſular ligament of the joint is to be cut from the ſcapula: and thus the arm will be entirely ſeparated.

After the arm has been ſeparated, any arteries which appear about the joint are to be tied, and all the ligatures brought over the edges of the wound. The parts are to be cleared of clotted blood, and the two flaps drawn over the wound, and ſecured by adheſive plaſters. A pledget of any emollient ſhould then be applied, and a ſufficient cuſhion of lint, with a compreſs of old linen, put over the whole. A moderate preſſure is next to be applied by a flannel roller; by which the parts will be ſupported, their union facilitated, and matter moſt likely prevented from being lodged. The treatment is then the ſame with that after amputation in other parts of the extremities. For two or three days after the operation, it is neceſſary that an aſſiſtant ſit with the patient to compreſs the artery in caſe a bleeding ſhould enſue.

When it is neceſſary to amputate *the whole hand*, the operation may be performed at the wriſt, ſo as to leave as much of the member as poſſible; and the ſame rules hold here as in amputating at any of the reſt of the joints. The tourniquet is to be applied to the artery in the arm, and the cure is to be completed by the firſt intention. When any of the carpal bones are affected, the ſore will not heal till they either work out by ſuppuration, or are cut out by the knife. When the middle of any of the metacarpal bones is diſeaſed, while their extremities are ſound, the trepan may be applied, and the diſeaſed parts removed, while the remaining ſound parts are preſerved. But if the whole bodies of one or two of theſe bones be affected, while the reſt remain ſound, all the affected bones ought to be removed. In performing the operation, an inciſion is to be made along the courſe of the part affected; and if the operator have it in his choice, the inciſion ſhould be made upon the back part, ſo as to ſave the great veſſels and nerves ſituated in the palm. The integuments are then to be diſſected, and turned to each ſide; after which the diſeaſed bones or parts of bones are to be removed, guarding as much as poſſible againſt wounding the principal arteries or nerves which lie near them.

The diſeaſed parts are next to be ſeparated; any arteries which happen to be cut are to be ſecured; and, on account of the free communication which they have with neighbouring branches, they ought to be tied at both cut ends. If after this a bleeding ſtill continue, compreſs, ſtyptics, and other remedies proper for ſtopping blood, are immediately to be uſed. The ſides of the wound are to be brought together, and an attempt made to cure them by the firſt intention.

In *amputating the fingers*, it was formerly the practice to operate upon the bodies of the bones in the ſame manner as in the larger extremities; but at preſent the removal at the joints is more frequently practiſed.

In performing the operation, it is neceſſary to ſave as much ſkin as may cover the ſtump, and this ought to be done upon the ſide next the palm, ſo as to guard againſt the effects of friction. The general ſteps of the operation are the ſame with thoſe for amputation of the larger joints.

A circular inciſion is to be made on the finger by a crooked biſtoury, about the middle of the phalanx, and it may be carried at once to the bone. Another inciſion is to be made with a common ſcalpel at each ſide of the finger, beginning at the circular one, and continuing it to the joint, by which two flaps will be left to cover the ſtump. The ligaments of the joint are now to be divided, and the bone removed. The blood-veſſels are to be ſecured by ligature, and the flaps exactly applied to each other; but in order to protect the end of the bone completely, a ſmall portion may be cut from the uppermoſt flap. The flaps are to be retained by adheſive plaſter, or by the twiſted ſuture; but if the latter be uſed, the tendons ought to be avoided. Over the ſore an emollient pledget is to be applied, and then a compreſs and roller. If the diſeaſe be ſo ſituated, that inſtead of amputating at the cavity of the joint, the ſurgeon ſhall think proper to operate upon the body of the bone, flaps are to be formed as above, and the bone is to be divided by means of a ſmall ſpring ſaw.

The amputation of the thigh, at *the hip joint*, has always been conſidered as one of the moſt formidable operations in ſurgery; ſo much ſo, that very few caſes appear on record of its having ever been put in practice. In the Medical Commentaries of Edinburgh, an inſtance is recorded where the thigh was amputated at this joint, and where the patient ſurvived the operation eighteen days, and then died from a different cauſe, when all riſk of hemorrhage was over, and when the ſore had even a favourable appearance; which ſhews at leaſt that the operation may be done with ſafety. It certainly ought never to be done, however, unleſs as the laſt reſource, and when the life of the patient is in abſolute danger; and then only when as much ſkin and muſcles can be ſaved as will cover the ſore, and when there is alſo a probability of being able to ſtop the hemorrhage, and prevent it from returning.

When the operation is to be performed, the patient is to be laid upon his back on a table, and properly ſecured by aſſiſtants; one of whom ſhould be ready with a firm cuſhion to preſs, if neceſſary, upon the top of the femoral artery juſt after it paſſes from behind Poupart's ligament to the thigh. A longitudinal inciſion is now to be made through the ſkin, beginning immediately under the ligament, and continuing it downwards along the courſe of the artery for about ſix or ſeven inches. The aponeuroſis of the thigh is then to be divided by gentle ſcratches till a furrowed probe can be introduced, when the opening is to be dilated by means of a ſcalpel, till two or three inches of the artery be laid bare. A ſtrong ligature is now to be put under the artery by the aſſiſtance of a curved blunt-pointed needle.

The part where the ligature ſhould be paſſed is immediately above the origin of the arteria profunda; for if that artery be not affected by the ligature, the patient might ſuffer by the loſs of blood during the reſt of the operation. The ligature is now to be ſecured by a running knot: another ligature is to be introduced a little below the former, and likewiſe ſecured; the artery is then to be divided between the ligatures. A circular inciſion is now to be made through the integuments of the thigh, about ſix inches from its upper end. The retracted ſkin is then to be pulled at leaſt an inch upwards; and at the edges of it the amputating knife is to be applied, ſo as to cut the muſcles down to the bone. This being done, a cut is to be made upon the poſterior part of the thigh, beginning a little higher than the great trochanter; and continuing it down to the circular inciſion, and as deep as the joint. A ſimilar cut is to be made on the anterior part of the thigh, at a ſmall diſtance from the artery, and this reaching likewiſe down to the bone. The two muſcular flaps are to be ſeparated from the bone and joint, and held back by an aſſiſtant. Every artery which appears is now to be ſecured. Then the capſular ligament, and next the round one, are to be ſeparated from the acetabulum; by which means the limb will be removed from the body. The acetabulum and neighbouring bone are next to be examined; and if they appear ſound, the caſe will be more favourable; but, at any rate, a cure is to be attempted by the firſt intention. For which purpoſe, after removing all the clotted blood from the ſurface of the wound, and bringing the ligatures over the edges of the ſkin, the muſcles are to be placed as nearly as poſſible in their natural ſituation; and drawing the flaps together, ſo as to cover the wound in the moſt accurate manner, they are to be kept in this ſituation by adheſive plaſter, and by the twiſted ſuture and other dreſſings, as in amputating at the under part of the thigh. The dreſſings are to be retained by a broad flannel roller paſſed three or four times round the body, and ſpirally over the ſtump, and ſecured. The patient is then to be laid in bed on the ſound ſide, and treated as for amputation in other parts of the body; only that greater attention is neceſſary, as there is no aſſiſtance from a tourniquet. Uncommon attention will alſo be neceſſary to prevent inflammation, and every ſymptom of fever which may ſucceed to the operation.

When *the foot* is ſo much diſeaſed as to require amputation, the operation might be performed at the point of the ankle; but for the reaſons given, when treating of amputation of the leg, it is found better to do it above the ankle. When a conſiderable part remains ſound, it ought to be ſaved. If any of the tarſal bones are affected, theſe are to be removed. When the middle or whole body of any of the metatarſal bones are diſeaſed, they are to be removed in the ſame manner as directed for ſimilar operations in bones of the hand; and if even two of them remain ſound, provided they be ſo placed as to ſupport the toes, they ought to be preſerved, as it is known that, by proper treatment, an oſſeous matter may afterwards fill a conſiderable part, if not the whole, of the void; or, if any cavity remain, it may be ſo filled that the uſe of the foot may ſtill be enjoyed.

In performing an operation of this kind, the patient ſhould be laid upon a table, and the tourniquet applied to the ham to prevent hemorrhage. An inciſion is then to be made along the affected part; and if the ſeat of the diſeaſe admit it, the inciſion ſhould be made upon the upper ſide of the foot, ſo as to ſave the ſole. The integuments are to be ſeparated and turned to each ſide, to allow the affected parts to be completely removed.

The principal veſſels and nerves are to be ſaved as much as poſſible; but if any particular artery be cut, it is to be ſecured, and the part treated as after the removal of ſimilar parts of the hand.

The amputation of *the toes* is exactly ſimilar to that of the fingers.

SECT. VI. *Of removing the* ENDS *of* CARIOUS BONES *in the* JOINTS.

In compound fractures, the ends of bones, when they protrude in ſuch a manner that they could not otherwiſe be returned, have frequently been ſawed through; and their place has frequently been ſupplied by a renewal of bone, ſo as to preſerve the ordinary uſe of the limb. Many caſes have likewiſe happened, where a large part of the body of the bone has been thrown out by ſuppuration, and its place ſupplied; and a few are upon record where either the whole of a bone, or that end next the joint, has been thrown out, and its place filled up with callus, ſo that no inconvenience has been felt. From theſe circumſtances, Mr. White of Mancheſter was led to preſerve an arm, by ſawing off the head of a diſeaſed humerus; and Mr. Park of Liverpool, to ſave a limb, by ſawing off the ends of the bones, in a caſe of white ſwelling of the knee. When, therefore, it happens that the end of a bone is diſeaſed, while the other parts are ſound, the diſeaſed part may be removed, and the ſound one ſaved, ſo as in a great meaſure to preſerve the free uſe the limb.

In performing the operation, the firſt ſtep ſhould be, to uſe ſuch means as may enable the operator to have a full management of the circulation of the part affected. Then a longitudinal inciſion of ſufficient length, and perhaps another acroſs it, may be neceſſary to be made through the ſoft parts of the joint; and this opening ought to be at a diſtance from the large blood-veſſels, that they may be in no danger of being injured. After the end of the diſeaſed bone is ſufficiently laid bare, it is either to be brought out of the joint, or a ſpatula or ſome other proper ſubſtance is to be introduced between the bone and ſoft parts, ſo as to defend the latter in time of ſawing the bone. After the diſeaſed part of the bone is removed, the arterial branches are to be ſecured, and the wound treated like any other wound of equal ſize.

During the cure, the limb ought to be kept in the poſture moſt favourable for the removal of the bone, and afterwards for the preſervation of the natural motion of the joint.

In this way a limb may ſometimes be ſaved which would otherwiſe have been removed. But though the removal of the diſeaſed end of one bone may be readily effected, the removal of all that part of the bones which enters into the compoſition of a joint muſt be attended with ſo much inconvenience, that it can ſeldom be uſeful, unleſs it be where the ends of bones are deſtroyed by external violence; for then it appears that this operation may be performed with conſiderable ſucceſs.

CHAP. XXXVI. Of CUTANEOUS DISEASES.

The knowledge of cutaneous diſeaſes has not kept pace with the other branches of chirurgical ſcience. A conſiderable ſhare of attention has been given by many, both of the ancient and modern writers, to the inveſtigation of the nature and phenomena of this claſs of complaints; but whether it has been from the real difficulty of the ſubject, or from the want of that minuteneſs of diſcrimination, which is ſo neceſſary for obtaining accurate ideas of diſeaſes characteriſed principally by their external appearance, our views on this ſubject have hitherto been very vague and imperfect.

The medical world muſt, therefore, have much ſatisfaction in knowing, that, in a recent publication, entitled, "*A Deſcription and Account of the Treatment of Cutaneous Diſeaſes*," by Dr. Willan, the inveſtigation of this obſcure ſubject has occupied the attention of a gentleman ſo well qualified to do juſtice to it. Nor will they be diſappointed at the peruſal of either the firſt part of the work (on *papulous eruptions*), or of that which more immediately belongs to the ſubject of the preſent volume. Both they will find eſtimable, as well from their clearneſs and perſpicuity, as from the ſtriking beauty and execution of the plates with which they are illuſtrated *.

A ſubject of this kind, which has not hitherto been treated in a ſyſtematic form, can ſcarcely be expected to be perfected by one man, however eminent for his talents or obſervation. We flatter ourſelves, however, that the ſubject will now be followed up by men of ability; that the deſcriptions of the author will be compared with the appearances as they preſent themſelves, any varieties or deviations pointed out, and thus what has been long a deſideratum in medical ſcience completely ſupplied.

Before we proceed in deſcribing the treatment of any of the cutaneous affections, the conſideration of which has been reſerved for this place, it may not be improper to preſent the reader with a ſketch of the arrangement which the author lays down, as well as to ſubjoin the definition of the terms he employs; which is particularly neceſſary, as the ſubject is nearly new.

He arranges cutaneous diſeaſes into ſeven orders, which are characteriſed by the different appearances of, 1ſt, Papulæ—2d, Scales—3d, Raſhes—4th, Veſicles—5th, Puſtules—6th, Tubercles—7th, Maculæ; and the generic diſtinctions compriſed under each order are as follow:

" ORDER I. Strophulus (red gum, tooth eruption, &c.)—Lichen (ſpring eruption, ſcorbutic pimples, &c.)—Prurigo (gratelle, or univerſal itching of the ſkin).

" ORDER II. Lepra (leproſy of the Greeks)—Pſoriaſis (dry or ſcaly tetter)—Pityriaſis (dandriff)—Ichthyoſis (fiſh-ſkin).

" ORDER III. Rubeola (meaſles)—Scarlatina (ſcarlet fever)—Urticaria (nettle-raſh)—Roſeola (ſummer-raſh, or roſe-raſh)—Purpura (purple or ſcorbutic raſh)—Erythema (red raſh).

" ORDER IV. Eryſipelas (St. Anthony's fire)—Pemphigus (veſicular fever)—Pompholyx (water-blebs)—Herpes (ring-worm, ſhingles, wildfire, &c.)—Varicella (chicken-pox)—Miliaria (miliary eruptions)—Eczema (heat-eruption)—Aphthæ (thruſh).

" ORDER V. Impetigo (running ſcab)—Ecthyma (ulcerated tetter)—Variola (ſmall-pox)—Scabies (itch)—Porrigo (ſcald head, &c.).

" ORDER VI. Phyma (boils, carbuncles, &c.)—Verruca (warts)—Acne (ſtone-pock; red, tuberculated face, &c.)—Lupus, or noli me tangere—Elephantiaſis (Arabian leproſy)—Framboæſia (yaws).

" ORDER VII. Ephelis (ſun-ſpots)—Nævus—Spilus, moles, and other original marks."

The definitions he gives are the following:

" I. SCURF (furfura); ſmall exfoliations of the cuticle, which

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* See the Lond. Med. Review, vol. VII. No. xxxi. from which we draw theſe remarks.

take place after ſome eruptions on the ſkin; a new cuticle being formed underneath during the exfoliation.

" II. SCALE (ſquama); a lamina of morbid cuticle, hard, thickened, whitiſh, and opaque.

" III. SCAB; a hard ſubſtance covering ſuperficial ulcerations, and formed by a concretion of the fluid diſcharged from them.

" IV. STIGMA; a ſmall red ſpeck in the ſkin, occaſioning no elevation of the cuticle. Stigmata are generally diſtinct or apart from each other. They ſometimes aſſume a livid colour, and are then termed petechiæ.

" V. PAPULA; a very ſmall and acuminated elevation of the cuticle, with an inflamed baſe, not containing a fluid, nor tending to ſuppuration.

" VI. RASH (exanthema); conſiſts of red patches on the ſkin, variouſly figured, in general confluent, and diffuſed irregularly over the body, leaving interſtices of a natural colour.

" VII. MACULA; a permanent diſcoloration of ſome portion of the ſkin, often with a change of its texture, but not connected with any diſorder of the conſtitution.

" VIII. TUBERCLE; a hard ſuperficial tumor, circumſcribed and permanent, or proceeding very ſlowly to ſuppuration.

" IX. VESICLE (bulla); an elevation of the cuticle, of a large ſize; irregularly circumſcribed, and containing a tranſparent watery fluid. Veſicles with a dark-red or liver-coloured baſe are uſually denominated phlyctænæ.

" X. PUSTULE; an elevation of the cuticle, ſometimes globate, ſometimes conoidal in its form, and containing pus, or a lymph which is in general diſcoloured."

The various kinds of puſtules are:

" 1. PHLYZACIUM; a puſtule containing pus, and raiſed on a hard, circular, inflamed baſe, of a vivid red colour. It is ſucceeded by a thick, hard, dark-coloured ſcab.

" 2. PSYDRACIUM; a minute puſtule, irregularly circumſcribed, producing but a ſlight elevation of the cuticle, and terminating in a laminated ſcab.

" 3. ACHOR; a puſtule, appearing moſt frequently about the head, which contains a ſtraw-coloured fluid, having the appearance, and nearly the conſiſtence, of ſtrained honey.

" 4. PHLYCTIS; a ſmall puſtule, with a circular baſe ſlightly inflamed, containing a lymph, which is ſometimes clear and pellucid, but more frequently whitiſh, like whey, or pearl-coloured. This puſtule terminates in a laminated ſcab.

" Under this head may be ranked the puſtules denominated by authors hydroa or hidroa, boa, ſudamina, and miliary puſtules."

" The SECOND ORDER, or SCALY DISEASES OF THE SKIN, includes thoſe affections which are characteriſed by an appearance of ſcales ariſing from a morbid ſtate of the cuticle, as ſpecified in the ſecond definition. The cuticle is not, however, the only ſeat of theſe complaints: their real origin ſeems often to be indurated papulæ, or larger elevations of the true ſkin, which by preſſure, or diſtenſion, injure the texture of the cuticle, and produce thickened irregular layers of it. The ſcales or cruſts thus formed have not always been diſtinguiſhed from ſcabs ſucceeding confluent puſtules, or ſuperficial ulcerations: whence we find, in medical writers, ſeveral diſſimilar diſeaſes improperly connected together. I ſhall endeavour," ſays Dr. Willan, " to avoid ſuch inaccuracies, by ſtrictly obſerving the ſecond and third definitions.

" The generic diſeaſes of the preſent order are, LEPRA, PSORIASIS, PITYRIASIS, and ICTHYOSIS." (See thoſe ſubjects in Vol. II.)

SECT. I. *Of the* LEPROSY.

" By the term LEPRA," ſays Dr. Willan, " I mean to expreſs the complaint ſo denominated by the moſt accurate of the Greek phyſicians. It is characteriſed by ſcaly patches, of different ſizes, but having always nearly a circular form. I have obſerved, in this country, three varieties of the diſeaſe, which may be deſcribed under the titles of *Lepra vulgaris*, *Lepra alphos*, and *Lepra nigricans*.

1. " The *lepra vulgaris* exhibits firſt ſmall, diſtinct elevations of the cuticle, which are reddiſh, and ſhining, but never contain any fluid. On their ſurface, when examined through a magnifier, the cuticular lines are found obliterated: and, within a few hours, a thin white ſcale is formed on the top of each of them. In three or four days the ſmall elevations appear flattened, and are at the ſame time dilated, by an extenſion of their baſes, to the ſize of a ſilver penny. Theſe patches continue to enlarge gradually, till they nearly equal the dimenſions of a crown-piece. They have always an orbicular or oval form, are covered with dry ſcales, and ſurrounded by a red border. The ſcales accumulate on them, ſo as to form a thick prominent cruſt, which is quickly reproduced, whether it fall off ſpontaneouſly, or may have been forcibly detached. After its removal, the ſurface appears, through a magnifier, to be porous, and irregular, or wrinkled, but the furrows do not coincide with the lines of the contiguous ſound cuticle. No pain or uneaſineſs attends the above eruption, except that a ſlight degree of itching is felt when the perſon affected with it becomes warm in bed, and that a ſenſation of tingling is produced by ſudden changes in the temperature of the atmoſphere.

" This ſpecies of lepra ſometimes appears firſt at the elbow, or on the fore-arm; but more generally about the knee. In the latter caſe, the primary patch forms immediately below the patella. Within a few weeks, ſeveral other ſcaly circles appear along the fore part of the leg and thigh, increaſing by degrees till they come nearly into contact. The diſeaſe is then often ſtationary for a conſiderable length of time. If it does advance further, the progreſs is towards the hip and loins; afterwards to the ſides, back, and ſhoulders; and about the ſame time to the arms and hands. In the greater number of caſes, the hairy ſcalp is the part laſt affected: although the circles formed on it remain for ſome time diſtinct, yet they finally unite, and cover the whole ſurface on which the hair grows with a white ſcaly incruſtation. This appearance is attended, more eſpecially in hot weather, with a troubleſome itching; and with a watery diſcharge for ſeveral hours, when any portion of the cruſt is detached, which takes place from very ſlight impreſſions. The pubes in adults is ſometimes affected in the ſame manner as the head: and if the ſubject be a female, there is uſually an internal pruritus pudendi. In ſome caſes of the diſorder, the nails, both of the fingers and toes, are thickened, and deeply indented longitudinally. Either the whole, or ſome part of each nail, is harder, and more prominent than uſual. Under ſeveral of them alſo may be obſerved one, two, or three, round yellowiſh ſpecks, which, on advancing to the end of the fingers, in conſequence of the growth of the nail, will be found to originate from a depoſition of curdly ſebaceous matter, having an extremely fetid odour.

" When the lepra extends to all the parts above mentioned, it becomes highly diſguſting in its appearance, and inconvenient from the ſtiffneſs and torpor occaſioned by it in the limbs. The diſeaſe, however, even in this advanced ſtage, is ſeldom diſpoſed to terminate ſpontaneouſly. It continues nearly in the ſame ſtate for ſeveral years, or ſometimes during the whole life of the perſon affected, not being apparently connected with any diſorder of the conſtitution.

" A regular mode of diet, with an appropriate medicinal courſe, acts very ſlowly on the lepra, yet will at length accompliſh its cure. The ſteps by which it proceeds to a termination are as follow: Firſt, the incruſtation ſeparates from about the centres of the patches, and is no longer reproduced. The ſcales being further and further removed, a circle of red ſhining cuticle, deeply indented, appears within the original patch, which ſtill retains a broad, hard, ſcaly ring, or border. This border continues till the cuticle within it aſſumes the uſual colour and texture. It then gradually diſappears; and the cuticular lines being extended over it, eraſe every veſtige of the diſeaſe."

This form of lepra, the author obſerves, generally affects both ſides, appearing at each elbow, or knee, about the ſame time, and extending from thence along the limbs in a ſimilar manner; the ſcaly patches conſtituting it are generally ſituated where the bone is neareſt the ſurface; and there is no alteration in the patches firſt affected till near the termination, when all of them begin to look better, nearly about the ſame time. The patches never appear on the cheeks, chin, noſe, or near the eyebrows. No diſadvantage ever ariſes from the obſtruction of perſpiration over a large ſurface, conſequent on this diſeaſe. The author confines the term lepra to the diſeaſe ſo called by the beſt Greek writers, and the deſcriptions given of it in Paulus Ægineta and Actuarius nearly anſwer to his. The Arabian phyſicians conſtantly apply the term lepra to the elephantiaſis of the Greeks; Celſus, as he does not make uſe of it at all, probably comprehended it under the general denomination of impetigo; and Hippocrates ſpeaks of it as a mere ſuperficial affection rather than a diſeaſe.

"The lepra is ſaid by ſome authors to be both contagious and hereditary; experience, however, ſufficiently demonſtrates that the lepra vulgaris is not contagious: but that there is a prediſpoſition to it communicated hereditarily, I can readily admit, having, in ſeveral inſtances, obſerved it to be thus tranſmitted. A ſlow pulſe, or a languid circulation of the blood, and, what muſt generally be connected therewith, a harſh, dry, impermeable ſtate of the ſkin and cuticle, appear to conſtitute a fundamental part of the prediſpoſition. From ſuch a ſtate of the integuments, morbid effects ariſe, more eſpecially at the decline of life: hence the diſeaſe much oftener occurs, and is more inveterate, after the age of forty, than at any earlier period; an obſervation made long ago by Hippocrates and Galen."

Of the occaſional cauſes, the author lays little ſtreſs upon different articles of food; the only ones which he can point out with any certainty, are expoſure to cold and moiſture, and the accumulation of ſordes on the ſkin, to which thoſe are peculiarly liable who work among dry powdery ſubſtances.

2. In the *lepra alphos* the ſcaly patches "are ſmaller than thoſe of the lepra vulgaris; and alſo differ from them in having their central part depreſſed or indented. This diſorder uſually begins about the elbow, with diſtinct, eminent aſperities, of a dull red colour, and not much larger than papulæ. Theſe in a ſhort time dilate to nearly the ſize of a ſilver penny. Two or three days afterwards, the central part of them ſuffers a depreſſion, within which, ſmall, white, powdery ſcales may be obſerved. The ſurrounding border, however, ſtill continues to be raiſed, but retains the ſame ſize, and the ſame red colour as at firſt. The whole of the fore-arm, and ſometimes the back of the hand, is ſpotted with ſimilar patches; they ſeldom become confluent, excepting round the elbow, which, in that caſe, is covered with an uniform, white cruſt. This affection appears in the ſame manner upon the joint of the knee, but without ſpreading far along the thigh or leg. I have ſeldom ſeen it on the trunk of the body, and never on the face. It is a diſeaſe of long duration, and not leſs difficult to cure

than the foregoing ſpecies of lepra: even when the ſcaly patches have been removed by perſevering in the uſe of ſuitable applications, the cuticle ſtill remains red, tender, and brittle, very ſlowly recovering its uſual texture. The ſmall hairs of the ſkin are not deſtroyed, as ſeveral authors ſtate, nor altered with reſpect to their colour and texture, in any form of the lepra Græcorum.

"The cauſes of the alphos are perhaps nearly the ſame as thoſe of the lepra vulgaris. It ſhould, however, be obſerved, that the alphos is found much oftener to affect young perſons, than the latter does.

3. "The *lepra nigricans* differs little from the lepra vulgaris, as to its form or diſtribution. The moſt ſtriking difference is in the colour of the patches, which are dark and livid. They appear firſt on the legs and fore-arms, extending afterwards to the thighs, loins, neck, and hands. Their central part is not depreſſed as in the alphos. They are ſomewhat ſmaller in ſize than the patches of the lepra vulgaris; and not only is the border livid, or purpliſh, but the livid colour of the baſe likewiſe appears through the ſcaly incruſtation, which is ſeldom very thick. It is further to be obſerved, that the ſcales are more eaſily detached than in the other forms of lepra, and that the ſurface remains longer excoriated, diſcharging lymph, often with an intermixture of blood, till a new incruſtation forms, which is uſually hard, brittle, and irregular.

"The lepra nigricans affects perſons whoſe occupation is attended with much fatigue, and expoſes them to cold or damp, and to a precarious or improper mode of diet, as ſoldiers, brewers' labourers, butchers, ſtage-coachmen, ſcullermen, &c. Some women are alſo liable to it, who are habituated to poor living and conſtant hard labour."

In the treatment of lepra, the Greek phyſicians always premiſed bleeding, and ſtrong purgative medicines, but depended moſt on various external applications.

Frequent bathing or waſhing ſeems, to the author, the moſt eſſentially neceſſary for the cure of the two firſt ſpecies of lepra; and he thinks, that the ſulphureous waters of Moffat, Harrowgate, and Croft, are of much ſervice, whether applied externally or internally. He ſpeaks favourably of the uſe of the Bath waters, from the authority of Dr. Falconer, and of ſea bathing; but it ſeems to him proper, at firſt to uſe a bath of warm ſea water till the ſkin be ſoftened, and then to go into the open ſea. The plan ſhould be purſued for ſeveral ſucceſſive ſummers. The ſimple warm bath may be ſufficient in the ſlighter attacks.

The watery ſolution of ſublimate, and the ung. hydrargyri nitrati, are very efficacious in removing the cruſt and ſoftening the ſkin; but they are not preferable to the tar ointment, which, to thoſe effects, joins that of allaying the troubleſome itching which often attends the diſeaſe. From the experience of the author, antimonials, ſulphur, and nitre, have no conſiderable efficacy, nor decoctions of emollient herbs, of guaiacum, ſarſaparilla, mezereon, or elm-bark, nor mercury, except in the form of ſublimate in ſmall doſes, nor nitrous or marine acid. He has found advantage from the aqua kali puri in the doſe of thirty drops three times a-day.

Black and white hellebore, the fleſh of vipers, tincture of cantharides, cucumbers, and the herb called Britannica, which ſeems to be a ſpecies of cochlearia, have been extolled by many.

The author gives a communication from Dr. Crichton, on the uſe of the ſolanum dulcamara, or bitter-ſweet, which we ſhall give in the doctor's own words:

"It is now upwards of ſeven years ſince I firſt tried the dulcamara for the cure of obſtinate diſeaſes of the ſkin. I was induced to do ſo by the peruſal of a ſhort, but well written, practical eſſay on the ſubject, by the learned Profeſſor of Botany in the univerſity of Goettingen, Dr. Althoff. This gentleman relates ten caſes of cutaneous eruption, which he deſcribes as analogous to the itch, but not the true itch, all of which were cured by this remedy. He confeſſes, at the ſame time, that it failed in a number of others. Profeſſor Althoff, and the other German phyſicians who employ it, ſeem to have taken their hint concerning it from the eſſay of Mons. Carrere on the Dulcamara.

"Out of twenty-three caſes of lepra Græcorum, in which I have tried it, two only have reſiſted its action. All the others were completely cured. That I was not miſtaken in the nature of the complaint, you yourſelf can teſtify, as you have ſeen two or three of the caſes alluded to, and in all the others the appearance of the diſeaſe was ſimilar.

"The true lepra is the only diſorder of the ſkin in which I could venture to aſſert the dulcamara will generally effect a cure. Next to lepra, it appears to me to do moſt good in pſoriaſis and pityriaſis. As to the rheumatiſm, for which it has been ſo highly praiſed by Boerhaave, Sauvage, Carrere, Werlhof, and others, I have not found it at all equal to the remedies which are generally employed in this country for the removal of that painful and troubleſome diſorder. I exhibit the dulcamara as follows:

(No. 144.) ℞. Stipitum dulcamaræ unciam j.
Aquæ puræ libram jß.
Decoque ad libram j. et liquorem frigefactum cola.

"Of this decoction, I generally deſire the patient to take two ounces, at firſt, every morning, noon, and evening; but I afterwards increaſe the quantity until the pint is conſumed every day. At the ſame time I order the patient to waſh the ſkin with a ſtronger decoction, which greatly accelerates the cure. The remedy ſeldom begins to exhibit any evident good effects for the firſt eight days.

"It ought to be remarked, that the dulcamara, when firſt exhibited to very delicate people, and hyſterical women, often produces ſyncope and ſlight palpitation of the heart, now and then nauſea and giddineſs; theſe ſymptoms always ſhew that the quantity exhibited is too large. If a ſmaller doſe be given, and any aromatic tincture added to it, ſuch as the compound ſpirit of lavender, it ceaſes to produce ſuch uneaſy ſymptoms."

None of the remedies above mentioned are applicable for the cure of the lepra nigricans. This form of the diſeaſe requires, in the firſt place, a regular and nutritive plan of diet, with moderate exerciſe: it may be afterwards wholly removed by the uſe of bark, and the mineral acids, ſea-bathing, &c.

SECT. II. PSORIASIS, *or* SCALY TETTER.

This diſeaſe is characteriſed by a rough and ſcaly ſtate of the cuticle, ſometimes continuous, ſometimes in ſeparate patches of various ſizes, but of an irregular figure, and for the moſt part accompanied with rhagades, or fiſſures in the ſkin. From the lepra it may be diſtinguiſhed by being more ſuperficial, variouſly figured, and throwing off bran-like patches; by its ceſſation and recurrence at certain ſeaſons; and by its being uſually attended with a diſorder of the conſtitution. Celſus deſcribes pſoriaſis as a ſpecies of impetigo, and ſome medical authors give it the denomination of pſora, or ſcabies ſicca.

Dr. Willan deſcribes the varieties of this complaint under the names of *pſoriaſis guttata*, *pſoriaſis diffuſa*, *pſoriaſis gyrata*, *pſoriaſis palmaria*, *pſoriaſis labialis*, *pſoriaſis ſcrotalis*, *pſoriaſis infantilis*, *pſoriaſis inveterata*.

1. "The *pſoriaſis guttata* appears in ſmall diſtinct, but irregular, patches of laminated ſcales, with little or no inflammation round them. The patches very ſeldom extend to the ſize of a ſixpence: they have not an elevated border, nor the oval or circular form by which all the varieties of lepra are diſtinguiſhed; but their circumference is ſometimes angular, and ſometimes goes into ſmall ſerpentine proceſſes. The ſcale formed upon each of them is thin, and may be eaſily detached, leaving a red, ſhining baſe. The patches are often diſtributed over the greateſt part of the body, but more particularly on the back part of the neck, the breaſt, arms, loins, thighs, and legs. They appear alſo on the face, which rarely happens in lepra; in that ſituation they are red, and more rough than the adjoining cuticle, but not covered with ſcales.

"The pſoriaſis guttata often appears on children in a ſudden eruption, attended with a ſlight diſorder of the conſtitution, and ſpreads over the body within two or three days. In adults, it commences with a few ſcaly patches on the extremities, proceeds very gradually, and has a longer duration than in children. Its firſt occurrence is uſually in the ſpring ſeaſon, after violent pains in the head, ſtomach, and limbs: during the ſummer it diſappears ſpontaneouſly, or may be ſoon removed by proper applications; but it is apt to return again early in the enſuing ſpring, and continues ſo to do for ſeveral ſucceſſive years. When the ſcales have been removed, and the diſeaſe is about to go off, the ſmall patches have a ſhining appearance: and they retain a dark red, intermixed with ſomewhat of a blueiſh colour, for many days, or even weeks, before the ſkin is reſtored to its uſual ſtate.

" In the venereal diſeaſe there is an eruption which very much reſembles the pſoriaſis guttata, the only difference being a ſlighter degree of ſcalineſs, and a different ſhade of colour in the patches, approaching to a livid red, or very dark roſe colour.

" This eruption is uſually ſeen upon the forehead, breaſt, between the ſhoulders, or in the inſide of the fore-arms, in the groins, about the inſide of the thighs, and upon the ſkin covering the lower part of the abdomen.

" When mercury is adminiſtered, the little ſcales are ſoon detached and fall off; but the diſcolouration ſtill remains, though it becomes gradually fainter as the mercurial courſe proceeds; and ſome veſtiges of the cutaneous affection uſually appear for two or three weeks after all the venereal ſymptoms have been removed.

" The ſyphilitic pſoriaſis guttata is attended with, or ſoon followed by, an ulceration of the throat. It appears about ſix or eight weeks after a chancre has been healed by an ineffectual courſe of mercury: a ſimilar appearance takes place at nearly the ſame period, in ſome caſes where no local ſymptoms had been noticed. When a venereal ſore is in a diſcharging ſtate, this eruption, or other ſecondary ſymptoms, often appear much later than the period above mentioned. They may alſo be kept back three months, or even longer, by an inefficient application of mercury. If no medicines be employed, the ſyphilitic form of the pſoriaſis guttata will proceed during ſeveral months, the number of the ſpots increaſing, and their bulk being ſomewhat enlarged, but without any other material alteration.

2. " The *pſoriaſis diffuſa* ſpreads into large patches irregularly circumſcribed, reddiſh, rough, and chappy, with ſcales interſperſed. It commences, in general, with numerous minute aſperities, or elevations of the cuticle, more perceptible by the touch, than by ſight. Upon theſe, ſmall diſtinct ſcales are ſoon after formed, adhering by a dark central point, while their edges may be ſeen white and detached. In the courſe of two or three weeks, all the intervening cuticle becomes rough and chappy, appears red, and raiſed, and wrinkled, the lines of the ſkin ſinking into deep furrows. The ſcales which form among them are often ſlight, and

repeatedly exfoliate. Sometimes, without any previous eruption of papulæ, a large portion of the ſkin becomes dry, harſh, cracked, reddiſh, and ſcaly, as above deſcribed. In other caſes the diſorder commences with ſeparate patches of an uncertain form and ſize, ſome of them being ſmall, like thoſe in the pſoriaſis guttata, ſome much larger. The patches gradually expand till they become confluent, and nearly cover the part or limb affected. Both the pſoriaſis guttata, and diffuſa, likewiſe occur as a ſequel of the lichen ſimplex. This tranſition takes place more certainly after frequent returns of the lichen.

"The parts moſt affected by the pſoriaſis diffuſa are the cheeks, chin, upper eyelids, and corners of the eyes, the temples, the external ear, the neck, the fleſhy parts of the lower extremities, and the fore-arm from the elbow to the back of the hand along the ſupinator muſcle of the radius: the fingers are ſometimes nearly ſurrounded with a looſe, ſcaly incruſtation; the nails crack and exfoliate ſuperficially. The ſcaly patches likewiſe appear, though leſs frequently, on the forehead and ſcalp, on the ſhoulders, back, and loins, on the abdomen, and inſtep. This diſeaſe occaſionally extends to all the parts above mentioned at the ſame time, but in general it affects them ſucceſſively, leaving one place free, and appearing in others, ſometimes again returning to its firſt ſituation.

"The pſoriaſis diffuſa is attended with a ſenſation of heat, and with a very troubleſome itching, eſpecially at night: it exhibits ſmall, ſlight, diſtinct ſcales, having leſs diſpoſition than the lepra to form thick cruſts. The chaps or fiſſures in the ſkin, which uſually make a part of this complaint, are very ſore and painful, but ſeldom diſcharge any fluid. When the ſcales are removed by frequent waſhing, or by the application of unguents, the ſurface, though raiſed and uneven, appears ſmooth and ſhining: and the deep ſurrows of the cuticle are lined by a ſlight ſcalineſs. Should any portion of the diſeaſed ſurface be forcibly excoriated, there iſſues out a thin lymph mixed with ſome drops of blood, which ſlightly ſtains and ſtiffens the linen, but ſoon concretes into a thin, dry ſcab: this is again ſucceeded by a white ſcalineſs, gradually increaſing, and ſpreading in various directions. As the complaint declines, the roughneſs, chaps, ſcales, &c. diſappear; and a new cuticle is formed, at firſt red, dry, and ſhrivelled, but which, in two or three weeks, acquires the proper texture.

"Symptoms of general diſorder attend the firſt appearance of the pſoriaſis diffuſa, as headach, inappetence, pain or ſickneſs at ſtomach; pains, cramps, and coldneſs of the extremities, with a ſenſe of univerſal languor and debility. During the progreſs of the eruption, theſe ſymptoms abate, or wholly diſappear; but they, for the moſt part, precede any returns of the complaint, which uſually take place in winter, or early in the ſpring. The duration of the pſoriaſis diffuſa is from one to four months.

" The complaint denominated with us the *baker's itch*, is an appearance of the pſoriaſis diffuſa on the back of the hand, commencing with one or two ſmall, rough, ſcaly patches, and finally extending from the knuckles to the wriſt. The rhagades, or chaps and fiſſures of the ſkin, are numerous about the knuckles, and ball of the thumb; and where the back of the hand joins the wriſt. They are often highly inflamed and painful, but have no diſcharge of fluid from them. The back of the hand is a little raiſed or tumefied, and, at an advanced period of the diſorder, exhibits a reddiſh, gloſſy ſurface, without cruſts, or numerous ſcales. This complaint is not general among bakers: it is only aggravated by their buſineſs, and affects thoſe who are otherwiſe diſpoſed to it.

" The *grocer's itch* has ſome affinity with the baker's itch, or tetter; but, being uſually a puſtular diſeaſe at its commencement, it probably belongs to another genus.

" *Waſherwomen*, probably from the irritation of ſoap, are liable to be affected with a ſimilar ſcaly diſeaſe on the hands and arms, ſometimes on the face and neck, which, in particular conſtitutions, proves very troubleſome, and of long duration.

" The venereal diſeaſe rarely aſſumes the form of pſoriaſis diffuſa.

3. " The *pſoriaſis gyrata* is diſtributed in narrow patches or ſtripes, variouſly figured: ſome of them are nearly longitudinal; ſome circular, or ſemicircular, with vermiform appendages; ſome are tortuous, or ſerpentine; others like earth-worms or leeches: the furrows of the cuticle being deeper than uſual, make the reſemblance more ſtriking, by giving to them an annulated appearance. There is a ſeparation of ſlight ſcales from the diſeaſed ſurface, but no thick incruſtations are formed. The uniform diſpoſition of theſe patches is ſingular: I have ſeen a large circular one ſituated on each breaſt above the papilla; and two or three others of a ſerpentine form, in analogous ſituations along the ſides of the cheſt. The back is often variegated in like manner, with convoluted tetters ſimilarly arranged on each ſide of the ſpine. They likewiſe appear in ſome caſes on the arms and thighs, interſecting each other in various directions. A ſlighter kind of this complaint affects delicate young women and children in ſmall ſcaly circles or rings, little diſcoloured: they appear on the cheeks, neck, or upper part of the breaſt, and are moſtly confounded with the herpetic or puſtular ring-worm.

" The pſoriaſis gyrata has its remiſſions and returns, like the pſoriaſis diffuſa; it alſo exhibits, in ſome caſes, patches of the latter diſorder on the face, ſcalp, or extremities, while the trunk of the body is chequered with the ſingular figures above deſcribed."

There is occaſionally an appearance in the venereal diſeaſe, ſomewhat analogous to the pſoriaſis gyrata, in which the tetters aſſume the form of a creſcent or horſe-ſhoe; or appear as rings, either oval or circular, the central part being neither ſcaly nor diſcoloured. If the progreſs is not ſtopped by medicines, theſe become at laſt ſuperficial ulcerations.

4. "The *pſoriaſis palmaria* is an obſtinate ſpecies of tetter, nearly confined to the palm of the hand. It commences with a ſmall, harſh, or ſcaly patch, which gradually ſpreads over the whole palm, and ſometimes appears in a ſlighter degree on the inſide of the fingers, and wriſt. The ſurface feels rough, from the detached and raiſed edges of the ſcaly laminæ: its colour often changes to brown, or black, as if dirty; yet the moſt diligent waſhing produces no favourable effect. The cuticular furrows are deep, and cleft at the bottom longitudinally in various places, ſo as to bleed on ſtretching the fingers. A ſenſation of heat, pain, and ſtiffneſs in the motions of the hand, attends this complaint: it is worſt in winter or ſpring, and occaſionally diſappears in autumn or ſummer, leaving a ſoft, dark, red cuticle: but many perſons are troubled with it for a ſeries of years, experiencing only very ſlight remiſſions. Every return or aggravation of it is preceded by an increaſe of heat, and dryneſs, with intolerable itching.

"*Shoemakers* have the pſoriaſis palmaria locally, from the irritation of the wax they ſo conſtantly employ. In *braſiers*, *tinmen*, *ſilverſmiths*, &c. the complaint ſeems to be produced by handling cold metals. A long prediſpoſition to it from a weak, languid, hectical, ſtate of the conſtitution, may give effect to different occaſional cauſes. We have obſerved it in women after lying-in; in ſome perſons it is connected, or alternates, with arthritic complaints."

Sometimes, Dr. Willan obſerves, a ſimilar appearance takes place on the ſoles of the feet; and ſometimes, in this diſeaſe, there is a thickening of the preputium, attended with painful cracks, and producing, at length, phymoſis.

5. "*Pſoriaſis labialis.* The pſoriaſis ſometimes affects the prolabium without appearing on any other part of the body. Its characteriſtics are, as uſual, ſcalineſs intermixed with chaps, and fiſſures of the ſkin. The ſcales are of a conſiderable magnitude, ſo that their edges are often looſe while the central points are attached. A new cuticle gradually forms beneath the ſcales, but it is not durable: in the courſe of a few hours it becomes dry, ſhrivelled, and broken; and, while it exfoliates, gives way to another layer of tender cuticle, which ſoon in like manner periſhes. Theſe appearances ſhould be diſtinguiſhed from the ſlight chaps and roughneſs of the lips produced by very cold or froſty weather, but eaſily removed. The pſoriaſis labialis may be a little aggravated by froſt, or ſharp winds, yet it receives no material alleviation from an oppoſite temperature: it is not indeed confined within any certain limit, or period of duration, having in ſeveral inſtances been protracted through all the ſeaſons. The under lip is always

more affected than the upper: and the diſeaſe takes place more eſpecially in thoſe perſons whoſe lips are full and prominent.

6. "*Pſoriaſis ſcrotalis.* The ſkin of the ſcrotum may be affected, in the pſoriaſis diffuſa, like other parts of the ſurface of the body: but ſometimes a roughneſs and ſcalineſs of the ſcrotum appears as an independent complaint, attended with much heat, itching, tenſion, and redneſs. The above ſymptoms are ſucceeded by a hard, thickened, brittle texture of the ſkin, and by painful chaps, or excoriations, which are not eaſy to be healed. This complaint is ſometimes produced under the ſame circumſtances as the prurigo ſcroti, and appears to be in ſome caſes a ſequel of it. A ſpecies of the pſoriaſis ſcrotalis likewiſe occurs in the lues venerea, but merits no particular attention, being always combined with other ſecondary ſymptoms of the diſeaſe.

7. *Pſoriaſis infantilis.* "Infants between the ages of two months and two years are occaſionally ſubject to the dry tetter. Irregular, ſcaly patches, of various ſizes, appear on the cheeks, chin, breaſt, back, nates, and thighs: they are ſometimes red, and a little rough, or elevated, ſometimes excoriated, then again covered with a thin incruſtation, and laſtly interſected by chaps or fiſſures. The general appearances nearly coincide with thoſe of the pſoriaſis diffuſa."

It is extremely difficult to diſtinguiſh the general appearance of the pſoriaſis infantilis, from the ſcaly patches which occur in infants, as ſecondary ſymptoms of the lues venerea. The latter are generally accompanied with a ſore throat, and a peculiar hoarſe ſound in the child's crying, which aſſiſts thoſe who are attentive, and experienced in forming a diagnoſis.

8. "The *pſoriaſis inveterata* is characteriſed by an almoſt univerſal ſcalineſs, with a harſh, dry, and thickened ſtate of the ſkin. It commences from a few irregular, though diſtinct, patches on the extremities. Others appear afterwards on different parts, and, becoming confluent, ſpread at length over all the ſurface of the body, except a part of the face, or ſometimes the palms of the hands, and ſoles of the feet. The ſkin is red, deeply furrowed, or wrinkled, ſtiff and rigid, ſo as ſomewhat to impede the motion of the muſcles, and of the joints. So quick, likewiſe, is the production and ſeparation of ſcales, that large quantities of them are found in the bed on which a perſon affected with this diſeaſe has ſlept. They fall off in the ſame proportion by day, and, being confined within the linen, excite a troubleſome and perpetual itching. An incruſtation of the ſcalp forms in the manner ſtated under the article lepra vulgaris. The nails of the fingers and toes become convex, and are thickened at their extremities. A frequent renewal of them takes place, the new nails ſoon aſſuming the morbid form. At their articulations, the thumb and fingers are enlarged, and contracted, or in ſome caſes retorted. On the

abdomen the ſkin is very red, deeply indented, and brittle: no thick incruſtation forms, but the ſcales appear thin, and ſemitranſparent, peeling off from time to time in large flakes. Painful excoriations are occaſioned by the preſſure of ſome parts of the clothing, or by the attrition of contiguous ſurfaces, as of the nates, groin, thighs, ſcrotum, &c. At an advanced period of the diſeaſe, the cuticle is often more extenſively deſtroyed: I have indeed," ſays Dr. Willan, " ſeen all the extremities, the back, and nates, excoriated at the ſame time, with a very profuſe diſcharge of thin lymph from the ſurface. In the courſe of a few weeks, however, that diſcharge uſually abates, when a new cuticle is formed, of a dry, harſh, or almoſt horny texture, and which from time to time ſeparates in large pieces. The ſame circumſtances are frequently repeated; and the diſeaſe proceeds on without any conſiderable remiſſion for an indeterminate length of time, eſpecially in old people. Young perſons are not ſo liable to it: nevertheleſs, I have ſeen it in ſome under thirty years of age, and in others before the time of puberty, ariſing, perhaps, from a ſtrong hereditary diſpoſition."

The pſoriaſis diffuſa occaſionally becomes permanent and inveterate, like the laſt-mentioned complaint.

Pſoriaſis, when of conſiderable extent, ſeems to be always connected with ſome diſeaſe of the conſtitution; and it is not contagious: it moſt frequently occurs in thoſe who have the ſanguineous, combined with the melancholic, temperament. Women are more liable to it than men, and they more particularly after lying-in. It frequently alſo occurs in young women labouring under chloroſis, and proves, in that caſe, very obſtinate.

Of the exciting cauſes, Dr. Willan obſerves, that " food, difficult of digeſtion, eating too great a quantity of acid fruits, the unſeaſonable uſe of the cold bath, large draughts of cold water taken when the body has been heated by exerciſe, and ſome improper mixtures of food, as of milk and fiſh, are the circumſtances to which patients refer the complaint when it appears in a ſudden eruption on the ſkin: and ſuch cauſes will," he apprehends, " be deemed ſufficient to excite the diſeaſe in thoſe who are prediſpoſed to it conſtitutionally."

" This diſeaſe generally occurs," according to the author's obſervations, " in the ſpring ſeaſon, when the changes of the ſtate of the atmoſphere are moſt frequent and ſevere."

The ſudden application of cold will ſometimes produce a retroceſſion of pſoriaſis; and whenever this occurs, there is vomiting and great diſturbance in the ſyſtem, which are beſt removed by the re-appearance of the eruption. On this ſubject, as on ſeveral others treated in this work, the author's obſervations and thoſe of Dr. Falconer, of Bath, nearly coincide.

" The three firſt ſpecies of pſoriaſis, when they appear in a ſudden eruption, attended with febrile ſymptoms, may be advantageouſly treated by adminiſtering in the evening an emetic doſe of ipecacuanha, and the following day two or three grains of calomel, or ſome other gentle purgative: afterwards, by the uſe of fixed alkali, either in its concrete or liquid form, by a light moderate diet, by frequently waſhing with tepid water, and by abſtinence from fruits, acids, and fermented liquors, the above diſorders may be brought to a concluſion within two or three weeks. But ſhould the ſcaly patches, through neglect at their firſt appearance, or from an unhealthy ſtate of the conſtitution, have enlarged conſiderably, and ſpread over the greater part of the body, a more elaborate plan will be neceſſary." This conſiſts of the free uſe of antimonials, of the warm bath, with repeated friction, and of the chalybeate or ſulphureous waters of different parts of the iſland. The decoctions of elm bark, ſarſaparilla, dulcamara, &c. have alſo their ſhare of utility.

" The *pſoriaſis inveterata* requires the ſame plan of treatment as the lepra vulgaris and alphos.

" For the *pſoriaſis palmaria* the ſame internal remedies are proper as for the other forms of the diſeaſe; vapour of hot water, oiled ſilk gloves, and diluted ung. nitratum, will occaſionally be uſeful.

" In the *pſoriaſis labialis* it is neceſſary to have the lips almoſt conſtantly covered with ſome mild unguent or plaſter; to avoid cold; to be temperate; and to take ſuitable ſtomachic medicines for the flatulence, &c.

" In the *pſoriaſis ſcrotalis*, beſides the uſe of general remedies, care ſhould be taken to keep the parts clean by waſhing them with warm water, water-gruel, &c. and to prevent the effects of attrition by unguent compoſed of three parts of unguentum ceræ, and one part of the unguentum hydrargyri nitrati.

" The ſcaly tetter of infants may be relieved by the uſe of antimonials, and by warm bathing, or waſhing with water-gruel. When conſiderable excoriations take place, it is proper to uſe mild applications, as the ceratum lapidis calaminaris, and unguentum ceruſſæ acetatæ, mixed in equal proportions. Calomel is occaſionally neceſſary, when there are inflamed puſtules, or tubercles."

SECT. III. PITYRIASIS, *or* DANDRIFF.

This conſiſts of irregular patches of ſmall, thin ſcales, which repeatedly form, and ſeparate; but never collect into cruſts, nor are attended with redneſs, or inflammation, as in the lepra, and ſcaly tetter. There are two varieties of it, the pityriaſis capitis, and pityriaſis verſicolor.

1. " *Pityriaſis capitis*, when it affects very young infants, is termed by nurſes the *dandriff.* It appears, at the upper edge of

the forehead and temples, as a ſlight whitiſh ſcurf ſet in the form of a horſe-ſhoe: on other parts of the head there are large ſcales, at a diſtance from each other, flat, and ſemi-pellucid. Sometimes, however, they nearly cover the whole of the hairy ſcalp, being cloſe together, and imbricated. A ſimilar appearance may take place in adults, but it is uſually the effect of lepra, ſcaly tetter, or ſome general diſeaſe of the ſkin. Elderly perſons have the pityriaſis capitis in nearly the ſame form as infants: the only difference is, that this complaint in old people occaſions larger exfoliations of the cuticle.

" When the hair is thin, or the head ſhaven, the ſcales may, with a little attention, be removed by the uſe of ſoap and warm water, or by a ſlight alkaline lotion. To enforce this practice is particularly neceſſary: for if ſcales intermixed with ſordes be permitted to cover the ſcalp for a length of time, puſtules, containing an acrimonious lymph, are formed under the incruſtation, and the true porrigo often ſupervenes, which is a diſeaſe of the ſcalp terminating in ſuppuration.

2. " The *pityriaſis verſicolor* chiefly affects the arms, breaſt, and abdomen. It is diffuſed very irregularly, and being of a different colour from the uſual ſkin-colour, it exhibits a ſingular, chequered appearance. The irregular patches, which are at firſt ſmall, and of a brown or yellow hue, appear at the ſcrobiculus cordis, about the mammæ, clavicles, &c. Enlarging gradually, they aſſume a teſſelated form; in other caſes they are branched, ſo as to reſemble the foliaceous lichens growing on the bark of trees; and, ſometimes, when the diſcolouration is not continuous, they ſuggeſt the idea of a map, being diſtributed on the ſkin like iſlands, continents, peninſulas, &c. All the diſcoloured parts are ſlightly rough, with minute ſcales, which ſoon fall off, but are conſtantly replaced by others. This ſcurf, or ſcalineſs, is moſt conſpicuous on the ſides, and epigaſtric region. The cuticular lines are ſomewhat deeper in the patches than on the contiguous parts: but there is no elevated border, or diſtinguiſhing boundary between the diſcoloured part of the ſkin, and that which retains its natural colour. The diſcolouration rarely extends over the whole body. It is ſtrongeſt and fulleſt round the umbilicus, on the breaſts, and ſides: it ſeldom appears in the ſkin over the ſternum, or along the ſpine of the back. Interſtices of proper ſkin-colour are moſt numerous and largeſt at the lower part of the abdomen and back, where the ſcales are often ſmall, diſtinct, and a little depreſſed. The face, nates, and lower extremities, are leaſt affected: the patches are found upon the arms, but moſtly on the inſide, where they are diſtinct, and of different ſizes."

It is not a cuticular diſeaſe, for on removing the cuticle the ſallow colour remains as before. It is not attended with any internal diſorder, is not limited to any age or ſex, and is always of conſiderable duration. Its cauſes, the author has not been able to point out with certainty. Though it is not a diſorder of any ſerious conſequence, yet the author thinks it proper that it ſhould be well underſtood, in order that it may not be miſtaken for a ſyphilitic ſymptom. "I cannot," ſays he, "ſpeak favourably of my ſucceſs in the medicinal treatment of this ſpecies of pityriaſis. Acids, alkalies, mercurials, and antimonials, under whatever form, ſeemed to produce no beneficial effect. Some advantage was, however, derived from uſing firſt a warm bath of ſea-water, and afterwards bathing in the open ſea: and in one inſtance the complaint was by this means wholly removed.

SECT. IV. ICTHYOSIS, *or* FISH-SKIN.

The characteriſtic of *ičthyoſis* is a permanently harſh, dry, ſcaly, and, in ſome caſes, almoſt horny texture of the integuments of the body, unconnected with internal diſorder. Pſoriaſis and lepra differ from this affection in being but partially diffuſed, and in having deciduous ſcales.

"The arrangement and diſtribution of the ſcales in icthyoſis are peculiar. Above and below the olecranon on the arm, and in a ſimilar ſituation with reſpect to the patella on the thigh and leg, they are ſmall, rounded, prominent or papillary, and of a black colour. Some of the ſcaly papillæ have a ſhort, narrow neck, and broad, irregular tops. On ſome parts of the extremities, and on the trunk of the body, the ſcales are flat and large, often placed like tiling, or in the ſame order as ſcales on the back of a fiſh; but in a few caſes they have appeared ſeparate, being interſected by whitiſh furrows. There is uſually, in this complaint, a dryneſs and roughneſs of the ſoles of the feet; ſometimes a thickened and brittle ſtate of the ſkin in the palms of the hands, with large painful fiſſures; and, on the face, an appearance of ſcurf rather than of ſcales. The inner part of the wriſts, the hams, the inſide of the elbow, the furrow along the ſpine, the inner and upper part of the thighs, are perhaps the only portions of the ſkin always exempt from the ſcalineſs. Patients affected with icthyoſis are occaſionally much haraſſed with inflamed puſtules, or with large, painful boils on different parts of the body: it is alſo remarkable that they never ſeem to have the leaſt perſpiration or moiſture of the ſkin.

"This diſeaſe did not, in any caſe that preſented, appear to have been tranſmitted hereditarily; nor was more than one child from the ſame parents affected with it. In ſeveral inſtances, the diſeaſe was ſaid to have been connate, and in others to have occurred two or three months after birth; in one caſe it appeared ſoon after the ſmall-pox, at the age of two years, and had continued ſix or ſeven years without alteration.

"When a portion of the hard, ſcaly coating is removed, it is not ſoon produced again. The eaſieſt mode of removing the ſcales is to pick them off carefully, with the nails, from any part of the body, while it is immerſed in hot water. The layer of cuticle which remains after this operation is harſh and dry; and the ſkin did not, in the caſes that occurred, recover its uſual texture and ſoftneſs; but the ſcales were prevented from forming afterwards by the repeated uſe of the warm bath, along with moderate friction."

Dr. Willan informs us, from Buffon, that the inhabitants of Paraguay are very ſubject to this complaint; and he alſo quotes a caſe from the Philoſophical Tranſactions, Vol. XIV. ſimilar to what he deſcribes. It is of a man of 40 years of age, who was affected, a few weeks after his birth, with a thickening of the ſkin, and the gradual formation of thick ruſtling ſcales of a dark colour, covering every part of his body, except his face, the palms of his hands, and the ſoles of his feet. This covering was without pain or uneaſineſs, and he ſhed it every year. He had ſix children, all of whom had the ſame covering, and, as well as himſelf, were free from it during the time of their having the ſmall-pox. Only one of them was living in the year 1754, whom the writer of this account ſaw with the father.

A ſimilar ſtate of the ſkin to that in icthyoſis, but in a much ſlighter degree, occurs ſometimes in the extremities of a perſon after long ill health; on the healing of inveterate ulcers of the legs; and in ſome caſes of anaſarca.

The author has never ſeen a caſe of *icthyoſis cornea;* but concludes with mentioning two; one from the Philoſophical Tranſactions, Vol. XLVIII. Part 2, the other from the Philoſophical Tranſactions, No. CLXXVI. In the former, the ſkin over the whole body (that of a young woman of 17 years of age) was hard to the touch, like wood or a dry hide; it prevented the free motion of any of the muſcles, gave her a ſenſe of tightneſs after eating, had loſt its natural warmth, and was inſenſible, except to preſſure by the nails or a pin. She never ſweated, and the urine was in conſiderable quantity, and loaded with ſalt.

The latter caſe is of a girl of 13 or 14 years of age, who was affected from her third year with horny excreſcences from various parts of the body, particularly the joints, both large and ſmall, which were faſtened to the ſkin like warts, and ſometimes fell off, and were renewed.

SECT. V. *Of the* HERPES SERPIGO, *or* RING-WORM.

This diſeaſe has not been well diſcriminated by any author, but it is one with which few practitioners are unacquainted.

The following account of a method employed in Bengal for the cure of the cutaneous diſeaſe, commonly known by the name of Ring-worm, by means of caſſunda vinegar, was publiſhed by Dr. Adam Freer, on the Bengal eſtabliſhment:

This diſorder, called by the natives *daud*, the author obſerves, is extremely tormenting during the rainy ſeaſon, and particularly affects Europeans. It makes its appearance on the thighs, and ſometimes ſpreads over the trunk of the body, neck, and face, obſtinately reſiſting the common remedies in cuticular affections, as preparations of lead, ſulphur, and even mercury. From the recommendation of Mr. James Champain, of Patna, Dr. F. employed in this diſeaſe a decoction, in vinegar, of a common ſhrub, the caſſunda *(caſſia ſophera, Linn.)* "Since that time," he obſerves, "I have uſed with the beſt ſucceſs, an ounce of the freſh bark, roots, tops, or flowers of the caſſunda, cut ſmall and boiled with a pint of good wine-vinegar, in an earthen veſſel, to eight ounces.

This vinegar, when cooled and ſtrained, is to be kept for uſe in a glaſs bottle well ſtopped. A drachm or two of the vinegar thus prepared, and applied to the parts affected two or three times a-day, waſhing with ſoap and water, and drying the parts with a towel previous to each application of the vinegar, is generally ſufficient to remove the diſorder. This vinegar may be kept for a year without any ſenſible diminution of its virtues.

"It has been obſerved, that the caſſunda vinegar does not always prevent a return of the complaint in the ſucceeding year, and that ſometimes caſes do occur, ſo obſtinate and inveterate, as to be little affected by it. I have met with very few of theſe caſes; but when they do occur, a purgative occaſionally repeated for three or four times, a vegetable diet, the daily uſe of cows-whey, and a calomel pill every night at bed-time, ſoon remove the diſorder.

"Although it be not always neceſſary, perhaps a bleeding, the warm bath, and a courſe of the diet mentioned, before the uſe of the caſſunda in any form, is adviſable."

SECT. VI. *Of the* ELEPHANTIASIS.

The beſt account any-where given of this diſeaſe, is that by Dr. Heberden, publiſhed in the firſt volume of the Medical Tranſactions. According to him, frequently, the firſt ſymptom is a ſudden eruption of tubercles, or bumps of different ſizes, of a red colour, more or leſs intenſe (attended with great heat and itching), on the body, legs, arms, and face: ſometimes in the face and neck alone, at other times occupying the limbs only: the patient is feveriſh; the fever ceaſing, the tubercles remain indolent, and in ſome degree ſcirrhous, of a livid or copper colour, but ſometimes of the natural colour of the ſkin, or at leaſt very little altered; and ſometimes they, after ſome months, ulcerate, diſcharging a fetid ichorous humour in ſmall quantity, but never laudable pus.

The features of the face ſwell and enlarge greatly; the part above the eye-brows ſeem inflated; the hair of the eye-brows falls off, as does the hair of the beard; but Dr. Heberden has never ſeen any one whoſe hair has not remained on his head. The *alæ naſi* are ſwelled and ſcabrous; the noſtrils patulous, and ſometimes affected with ulcers, which, corroding the cartilage and *ſeptum naſi*, occaſion the noſe to fall. The lips are tumid; the voice is hoarſe; which ſymptom has been obſerved when no ulcers have appeared in the throat, although ſometimes both the throat and gums are ulcerated. The ears, particularly the lobes, are thickened, and occupied by tubercles. The nails grow ſcabrous and rugoſe, appearing ſomewhat like the rough bark of a tree; and the diſtemper advancing, corrodes the parts gradually with a dry ſordid ſcab or gangrenous ulcer; ſo that the fingers and toes rot and ſeparate joint after joint. In ſome patients the legs ſeem rather poſts than legs, being no longer of the natural ſhape, but ſwelled to an enormous ſize, and indurated, not yielding to the preſſure of the fingers; and the ſuperfices is covered with very thin ſcales, of a dull whitiſh colour, ſeemingly much finer, but not ſo white as thoſe obſerved in the *lepra Græcorum*. The whole limb is overſpread with tubercles, interſperſed with deep fiſſures; ſometimes the limb is covered with a thick moiſt ſcabby cruſt, and not unfrequently the tubercles ulcerate. In others the legs are emaciated, and ſometimes ulcerated; at other times affected with tubercles without ulceration. The muſcular fleſh between the thumb and forefinger is generally extenuated.

The whole ſkin, particularly that of the face, has a remarkably ſhining appearance, as if it were varniſhed or finely poliſhed. The ſenſation in the parts affected is very obtuſe, or totally aboliſhed; ſo that pinching, or puncturing the part, gives little or no uneaſineſs; and in ſome patients, the motion of the fingers and toes is quite deſtroyed. The breath is very offenſive; the pulſe in general weak and ſlow.

The diſeaſe often attacks the patient in a different manner from that above deſcribed, beginning almoſt inſenſibly; a few indolent tubercles appearing on various parts of the body or limbs, generally on the legs or arms, ſometimes on the face, neck, or breaſt, and ſometimes in the lobes of the ears, increaſing by very ſlow degrees, without any diſorder, previous or concomitant, in reſpect of pain or uneaſineſs.

To diſtinguiſh the diſeaſe from its manner of attacking the patient, Dr. Heberden ſtyles the firſt by *fluxion* and the other by *congeſtion*. That by fluxion is often the attendant of a crapula, or ſurfeit from groſs foods; whereby, perhaps, the latent ſeeds of the diſorder yet dormant in the maſs of blood are excited; and probably from frequent obſervations of this kind (the laſt meal always having the blame laid on it), it is, that, according to the received opinion, either fiſh (the tunny, mackarel, and ſhell-fiſh, in particular), melons, cucumbers, young garden beans, or mulberries, eaten at the ſame meal with butter, cheeſe, or any preparation with milk, are ſuppoſed to produce the diſeaſe, and are accordingly religiouſly avoided.

Violent commotions and agitation of the mind, as anger, fear, and grief, have more than once been obſerved to have given riſe to the diſorder: and more frequently, in the female ſex, a ſudden ſuppreſſion of an accuſtomed evacuation, by bathing the legs and feet in cold water at an improper ſeaſon.

The diſorder that occurs by fluxion is what is the ofteneſt endeavoured to be remedied by timely applications; that by congeſtion, not being ſo conſpicuous, is generally either neglected or attempted to be concealed, until perhaps it be too late to be cured; at leaſt unleſs the patients would ſubmit to a longer courſe of medicine and ſtricter regimen of diet than they are commonly inclined to adopt.

Several incipient diſorders by fluxion have been known to yield to an antiphlogiſtic method, as bleeding, refrigerant ſalts, the ſaline draughts, and a ſolution of cryſtals of tartar in water, for common drink (by this means endeavouring to precipitate part of the peccant matter, perhaps too groſs to paſs the pores by the kidneys); and when once the fever is overcome, the Peruvian bark combined with ſaſſafras is the remedy principally to be relied on. The only topical medicine preſcribed by Dr. Heberden, was an attenuating embrocation of brandy and alkaline ſpirits. By the ſame method ſome confirmed caſes have been palliated. But, excepting in one patient, he never ſaw or heard of a confirmed elephantiaſis radically cured. He adds, however, that he never met with another patient poſſeſſed with prudence and perſeverance enough to proſecute the cure as he ought.

Dr. Temple ſpeaks of the cure in the following way:

This diſeaſe has generally been found incurable. The warm bath ſhould be ordered; if the patient is plethoric, and inflammatory ſymptoms are preſent, bleeding and cooling laxatives, ſuch as cryſt. tart. with a light diet, ſhould be adviſed. When this ſtate is removed, ſome advantage has been thought to have been derived from the cinchona. Iſſues are adviſed, and the following embrocation:

(No. 145.) ℞ Spt. vin. ten. ℥viij.
Aq. kali ℥j.
Aquæ ammoniæ ℥ij. M. fiat Embrocatio.

The following he alſo ſays may be tried:

(No. 146.) ℞ Calomel. ppt.
Sulph. antimon. præcipit. aa ℈j.
Mic. panis q. ſ.
Miſce fiant pill. No. x. capt. j. vel. ij. mane et veſpere quotidie.

That exploded remedy, the fleſh and fat of vipers, it appears, has been lately again introduced into practice, and ſaid to be of ſervice in this diſeaſe.

In the New Medical Journal, *white arſenic* is recommended as a cure for the elephantiaſis, in an extract from the Aſiatic Reſearches. It is directed in the following manner:

“ *Take of white arſenic, fine and freſh, one part; of picked black* “ *pepper, ſix parts.*

“ Let both be beaten well, at intervals, for four days ſucceſſively, “ in an iron mortar, and then reduced to an impalpable powder “ in one of ſtone, with a ſtone peſtle, and thus completely levi- “ gated, a little water being mixed with them, make pills of “ them as large as tares or ſmall pulſe, and keep them dry in a “ ſhady place.

“ One of theſe pills muſt be taken morning and evening, with “ ſome betel leaf, or, in countries where the betel is not to be “ had, with cold water; if the body be cleanſed from foulneſs “ and obſtructions by gentle cathartics and bleeding, before the “ medicine is adminiſtered, the remedy will be ſpeedier.”

Every practitioner, however, ſhould be extremely cautious of employing this dangerous remedy, either in this or any other caſe. When it is employed, however, we are diſpoſed to recommend the *arſenicated kali* in preference to the above formula.

Dr. Hugh Smith aſſerts, that antimonial remedies are preferable in this diſeaſe to mercurials; but we apprehend they are beſt joined, as in (No. 124. Vol. I.) The doctor gives us the following formulæ:

(No. 147.) ℞ Antimon. crud. ʒß.
Conſ. cochlear. hort. ℈j.
Syr. ſimp. q. ſ.
Fiat Bol. bis die ſumend. ſuperbibend. decoct. ſeq. ℔ß.

(No. 148.) ℞ Cort. ulmi recent. ℔j.
Coque ex aq. fontan. q. ſ. ad colatur. ℔viij.

(No. 149.) ℞ Unguent. ſimp. ℥ij.
Ceruſſ. acetat. ʒj.
Miſce fiat Linimentum partib. affect. applicandum.

The doctor alſo recommends the alterative pill (No. 103. Vol. I.)

SECT. VII. FRAMBŒSIA, *or the* YAWS.

The deſcription which is given of the nature of this diſeaſe by the anonymous author of a paper in the ſixth volume of the Edinburgh Medical Eſſays (art. 76.) differs, in ſome circumſtances, from one that Sauvages received from M. Virgile, an eminent ſurgeon of Montpellier, who practiſed twelve years in the iſland of St. Domingo; and, therefore, he diſtinguiſhes the *Frambœſia* into two ſpecies, *Guineenſis* and *Americana.*

The *frambœſia Guineenſis* is ſaid by the firſt-mentioned writer to be ſo common on the coaſt of Guinea and other parts of Africa, that it ſeldom fails to attack each individual of both ſexes, one time or other, in the courſe of their lives; but moſt commonly during childhood or youth. "It makes its appearance in little ſpots on the cuticle, level with the ſkin, at firſt no larger than a pin's head, which increaſe daily, and become protuberant like pimples; ſoon after the cuticle frets off, and then, inſtead of finding pus or ichor in this ſmall tumor, only white ſloughs or ſordes appear, under which is a ſmall red fungus, growing out of the cutis, increaſing gradually to very different magnitudes, ſome leſs than the ſmalleſt wood ſtrawberry, ſome as big as a raſpberry, and others exceeding in ſize even the largeſt mulberries; which berries they very much reſemble, being knobbed as they are." Theſe protuberances, which give the name to the diſeaſe, appear on all parts of the body: but the greateſt numbers, and the largeſt ſized, are generally found in the groins, and about the pudenda or anus, in the arm-pits, and on the face: when the yaws are very large, they are few in number; and when remarkably numerous, they are leſs in ſize. The patients, in all other reſpects, enjoy good health, do not loſe their appetite, and ſeem to have little other uneaſineſs than what the ſores occaſion.

M. Virgile deſcribes the ſpecies of yaws that is common among the negroes of St. Domingo, and which Sauvages has termed *frambœſia Americana*, as beginning from an ulcer that breaks out indiſcriminately in different parts of the body, though moſt commonly on the legs; at firſt ſuperficial, and not different from a common ulcer in any other circumſtances ſave its not healing by the uſual applications; ſooner or later, numerous fungous excreſcences break out on the ſurface of the body, as before deſcribed, like little berries, moiſt, with a reddiſh mucus. Beſides theſe, the ſoles of the feet and palms of the hands become raw, the ſkin fretting off, ſo as to leave the muſcles bare; theſe excoriations are ſometimes moiſt with ichor, and ſometimes dry, but always painful, and conſequently very diſtreſſing. They are mentioned alſo by the author of the article in the Medical Eſſays; and both he and M. Virgile obſerve, that there is always one excreſcence, or yaw, of an uncommon ſize, longer in falling off than the others, and which is conſidered as the *maſter-yaw*, and ſo termed. An ingenious inaugural diſſertation on the ſubject of the yaws was alſo publiſhed at Edinburgh by Dr. Jonathan Anderſon Ludford, now phyſician in Jamaica. The author of that diſſertation conſiders Dr. Cullen as improperly referring frambœſia to the claſs of cachexiæ. He thinks that this diſeaſe ought rather to be referred to the exanthemata; for, like the ſmall-pox, he tells us it has its acceſſion, height, and decline. It begins with ſome degree of fever, either more or leſs violent; it may be propagated by inoculation; and it attacks the ſame individual only once in the courſe of a life-time, thoſe who once recover from the diſeaſe being never afterwards affected with it. Theſe particulars reſpecting frambœſia are reſted not merely on the authority of Dr. Ludford, but are ſupported alſo by the teſtimony of Dr. William Wright, a phyſician of diſtinguiſhed eminence, who, while he reſided in Jamaica, had, in the courſe of an extenſive practice, many opportunities of obſerving this diſeaſe, and to whom Dr. Ludford acknowledges great obligations for having communicated to him many important facts reſpecting it.

Dr. Ludford conſiders the yaws as being in every inſtance the conſequence of contagion, and as depending on a matter *ſui generis*. He conſiders no peculiar prediſpoſition from diet, colour, or other circumſtances, as being in any degree neceſſary. He views the diſeaſe as chiefly ariſing from contact with the matter, in conſequence of ſleeping in the ſame bed, waſhing in the ſame veſſel with the infected, or the like. In ſhort, the yaws may be communicated by any kind of contact; nay, it is even believed that flies often convey the infection, when, after having gorged themſelves with the virulent matter by ſucking the ulcers of thoſe who are diſeaſed, they make punctures in the ſkin of ſuch as are ſound, and thus inoculate them; in conſequence of which the diſorder will ſoon appear, provided the *morbific diſpoſition* of the body be preſent.

The yaws are not conſidered as dangerous, if the cure be ſkilfully managed at a proper time; but if the patient has been prematurely ſalivated, or has taken any quantity of mercury, and his ſkin been ſuddenly cleared thereby, the cure will be very difficult, if not impracticable.

In attempting the cure of this extraordinary diſeaſe, the four following indications are chiefly to be held in view:

1. To ſupport the ſtrength of the patient.
2. To promote excretion by the ſkin.
3. To correct the vitiated fluids.
4. To remove and counteract the injuries done either to the conſtitution in general, or to particular parts by the diſeaſe.

With the firſt of theſe intentions, a liberal diet, conſiſting of a conſiderable quantity of animal food, with a conſiderable proportion of wine, and gentle exerciſe, are to be employed: but the cure is principally to be effected by mercurial ſalivation, after the virulent matter has been completely thrown out to the ſurface of the body by ſudorifics. The following are the particular directions given on this head by the author of the article in the Medical Eſſays. The yaws being an infectious diſeaſe, as ſoon as they begin to appear on a negro, he muſt be removed to a houſe by himſelf; or, if it is not certain whether the eruption be the yaws or not, ſhut him up ſeven days, and look on him again, as the Jews were commanded to do with their lepers, and in that time you may be commonly certain.

As ſoon as you are convinced that it is the yaws, give a bolus of flowers of ſulphur, with camphor and theriaca. Repeat this bolus every night for a fortnight or three weeks, or till the yaws come to the height; that is, when they neither increaſe in ſize nor number: then throw your patient into a gentle ſalivation with calomel given in ſmall doſes, without further preparation: five grains repeated once, twice, or thrice a-day, is ſufficient, as the patient can bear it. If he ſpits a quart in twenty-four hours, it is enough. Generally, when the ſalivation is at its height, all the yaws are covered with a dry ſcaly cruſt or ſcab; which, if numerous, look terribly. Theſe fall off daily in ſmall white ſcales; and in ten or twelve days leave the ſkin ſmooth and clean. Then the calomel may be omitted, and the ſalivation permitted to go off of itſelf. A dram of corroſive ſublimate diſſolved in an ounce of rum or brandy, and the ſolution daubed on the yaws, will, it is ſaid, in general clear the ſkin in two days' time.

After the ſalivation, ſweat the patient twice or thrice in a frame or chair with ſpirits of wine; and give an alterative electuary of æthiops and gum-guaiac. He may likewiſe uſe the decoction of guaiacum and ſaſſafras fermented with melaſſes, for his conſtant drink, while the electuary is taking, and a week or a fortnight after the electuary is finiſhed.

The maſter-yaw muſt be conſumed an eighth or a tenth part of an inch below the ſkin, with

(No. 150.) ℞ Hydrarg. nitrat. rub.
Alumin. uſt. ſing. ʒj.
Miſce fiat Pulvis.

To digeſt the wound:

(No. 151.) ℞ Hydrarg. nitrat. rub. (opt. lævig.) ʒj.
Unguent. reſinæ flavæ ℥j. Miſce.

It ſhould be cicatrized with lint preſſed out of ſpirits of wine, with ſome vitriolated copper in it.

After the yaws are cured, ſome patients are afflicted with carbuncles in their feet; which ſometimes render them incapable of walking, unleſs with pain. The method of cure is, by bathing and paring, to deſtroy the cuticle, and then proceed as in the maſter-yaw. The gentle eſcharotics are to be preferred, eſpecially here; and all imaginable care is to be taken to avoid the tendons and perioſteum.

To children under ſix or ſeven years old, at the proper time of ſalivating, when the yaws are come to their full growth give a grain or two of calomel in white ſugar, once a-day, once in two days; or once in three days, ſo as only to keep their mouths a little ſore till the yaws dry, and, falling off in white ſcales, leave the ſkin clean. This ſucceeds always, but requires a longer time than in adults.

In St. Domingo they ſalivated by unction: but it does not appear that ſucceſs always followed this practice. It is alſo uſual in that iſland to give the ſolution of corroſive ſublimate along with a decoction of ſarſaparilla. Twelve ounces of this root, and twelve pounds of the coarſeſt ſugar, macerated for fifteen days in twelve quarts of water, is mentioned as a ſpecific, and ſaid to be the preſcription of an Engliſh phyſician; the doſe is four ounces every ſixth hour.

SECT. VIII. *Of the* PLICA POLONICA, *or* PLAITED HAIR DISEASE.

We ſpoke conciſely of this ſingular diſeaſe under MEDICINE (vol. II. p. 510). Mr. Coxe, who gives a ſhort account of it, attempts likewiſe to give the phyſical cauſes of it. Many cauſes of this kind, he tells us, have been ſuppoſed to concur in rendering the plica more frequent in thoſe regions than in other parts. It would be an endleſs work to enumerate the various conjectures with which each perſon has ſupported his favourite hypotheſis. The moſt probable are thoſe aſſigned by Dr. Vicat: the firſt cauſe is the nature of the Poliſh air, which is rendered inſalubrious by numerous woods and moraſſes, and occaſionally derives an uncommon keenneſs even in the midſt of ſummer from the poſition of the Carpathian mountains; for the ſouthern and ſouth-eaſterly winds, which uſually convey warmth in other regions, are in this chilled in their paſſage over their ſnowy ſummits. The ſecond is unwholeſome water; for, although Poland is not deficient in good ſprings, yet the common people uſually drink that which is neareſt at hand, taken indiſcriminately from rivers, lakes, and even ſtagnant pools. The third cauſe is the groſs inattention of the natives to cleanlineſs; for experience ſhews, that thoſe who are not negligent in their perſons and habitations, are leſs liable to be afflicted with the plica than others who are deficient in that particular. Thus, perſons of higher rank are leſs ſubject to this diſorder than thoſe of inferior ſtations; the inhabitants of large towns, than thoſe of ſmall villages; the free peaſants, than thoſe of an abſolute ſtate of vaſſalage; the natives of Poland Proper, than thoſe of Lithuania, Whatever we may determine as to the poſſibility that all or any of theſe cauſes, by themſelves, or in conjunction with others, originally produced the diſorder; we may venture to aſſert, that they all, and particularly the laſt, aſſiſt its propagation, inflame its ſymptoms, and protract its cure. In a word, the plica polonica appears to be a contagious diſtemper; which, like the leproſy, ſtill prevails among a people ignorant in medicine, and inattentive to check its progreſs, but is rarely known in thoſe countries where proper precautions are taken to prevent its ſpreading.

CHAP. XXXVII. OF DISTORTIONS AND CONTRACTIONS.

THESE complaints require a particular management, according to the cauſes which may have produced them. In the greater number of inſtances they are rather to be conſidered as the conſequences of diſeaſe than as original affections. We ſhall treat of them under diſtinct heads for that reaſon.

SECT. I. *Of* DISTORTIONS.

Diſtortions of the bones may ariſe from external injuries, from diſeaſed conſtitutions, from a morbid ſtate of the bones, or a contracted ſtate of the muſcles, or both; but the affection is moſt frequently owing to a weakly, delicate conſtitution, as in rickety or ſcrophulous caſes. As infancy is the period when diſtortions moſt frequently take place, and that indeed when the remedy is to be applied with the greateſt ſucceſs, we ſhall here treat the ſubject ſomewhat briefly; reſerving for our chapter on *the* DISEASES *of* CHILDREN ſome important obſervations on the mechanical aſſiſtance of which theſe caſes admit, from the pen of Mr. Sheldrake.

In the treatment of diſtortions of the ſpine, particular attention ought to be paid to the cauſe of the diſorder. If it appear to riſe from the patient continuing too long in any particular poſture, every habit of this kind ſhould be guarded againſt on the firſt appearance of the diſeaſe. If the patient has turned too much to one ſide, the reverſe of this ſhould be adviſed. He ought to ſleep upon a firm hair mattreſs, that his body may lie upon an equal ſurface. He ſhould uſe an invigorating diet, the cold bath, bark, and other tonics. By a ſtrict attention to the uſe of theſe remedies, the diſeaſe has ſometimes been retarded in its progreſs. Various machines have been invented for removing diſtortions of the ſpine by preſſure; but conſiderable caution is here required, otherwiſe much injury may ariſe from it. Some advantage, however, in certain caſes, has been derived from the uſe of the common collar (Plate III. fig. 90); but the ſtays and machinery adapted to them (fig. 91), invented in France, and afterwards brought into uſe in this country by Mr. Jones of London, are found to be ſtill better ſuited to this purpoſe.

The ſame cauſes which produce diſtortions of the ſpine, may likewiſe produce diſtortions of the limbs. Sometimes the diſtortion takes place with the original formation of the bones, at other times it occurs in infancy, and now and then at a more advanced period of life. In early infancy the bones are ſo pliable as to be readily affected by the poſtures of the body. When a child is too ſoon allowed to attempt to walk, its legs are apt to become crooked from their inability to ſupport the weight of the body. Certain diſeaſes likewiſe, eſpecially rickets, ſoften the bones ſo much, that they yield to the poſture of the body, and to the common action of their muſcles.

When the diſtortion of a limb is owing to a curvature in a bone, if the caſe be recent, and eſpecially if it occur in childhood, it may frequently be removed, without much difficulty, by making a gradual but conſtant preſſure, by the uſe of machinery, on the convex ſide of the limb, till it recover its natural appearance. When the deformity occurs in the leg, a method has been uſed, in ſeveral inſtances, which is to fix a firm ſplint of iron, lined with leather, in the ſhoe, on the concave ſide of the leg, the other end of the ſplint to reſt againſt the under end of the thigh: when, if a broad ſtrap or two be applied round the leg and ſplint, an eaſy gradual preſſure may be made, and conſiderable advantage derived from it. See fig. 92.

Along with the curvature above mentioned, it commonly happens that the feet and ankles are affected. When the bones of the legs are bent outward, the fore part of the foot is turned inward, and the inner edge upwards; and the reverſe, if the leg be bent inward. In theſe caſes the affections of the feet are generally owing to the curvature of the bones of the leg. By removing the curvature of theſe, the foot will commonly regain its natural ſituation, and the ſplint above mentioned will for the moſt part be ſufficient for the purpoſe. But in caſes where the ſole of the foot is turned much out of its natural direction, it may be neceſſary to fix the ſplint and ſhoe to a frame (fig. 93), which will render the cure ſtill more effectual.

Beſides the inſtrument already mentioned, ſome have uſed a kind of boot, cut lengthwiſe, made of hardened leather or of metal, &c. which may in ſome caſes ſufficiently anſwer the purpoſe.

In caſes of club-foot, where the diſtortion is in the middle of the foot, a pair of ſhoes, ſuch as are repreſented by fig. 94. have been found uſeful. After the feet are fixed in the ſhoes, the fore part of the feet may be ſeparated by means of a ſcrew in two plates, which are fixed to the ſole.

To this account of the treatment of diſtortions we annex the following remarks by Mr. Sheldrake:

"Diſtorted ſpine," ſays Mr. S., "when it takes place in adults, is the conſequence of deranged muſcular action, of local diſeaſe, or of general debility; this may either be the only diſeaſe, or it may act in conjunction with either of the former in producing the deformity.

" Under the firſt head ſhould be included moſt of thoſe diſtortions which are ſo frequent among female children of the middling and upper ranks of life, as well as among various manufacturers and perſons confined to ſuch labour as obliges them to keep themſelves much in peculiar poſtures; for it is certain that, whatever may be the motive that induces various perſons to habituate themſelves to peculiar habits or attitudes, the effect will be the ſame; the equality of action to which all parts of the body are adapted, and which is eſſential to the preſervation of this form, will be impeded; unequal action will be produced, and in proportion as the parts accuſtom themſelves to this unequal action, their capacity for the natural action diminiſhes till it is totally loſt; a peculiarity of form begins, and terminates in actual deformity, which continually increaſes, unleſs all the practices which occaſioned it are laid aſide, and proper methods adopted to obviate the deformity that has already been produced.

" Diſtorted ſpine from this cauſe is ſo frequent among children, that it is very generally ſaid that none but children can be afflicted with it, or, in other words, that when people are grown up their bones become fixed, and they are not liable to become deformed; it is ſaid, too, that when perſons ſo deformed have arrived at maturity, their bones are ſo fixed that they are incapable of alteration, and, of courſe, the deformity cannot be removed. Neither of theſe opinions are true; for it is moſt certain, that if a perſon not accuſtomed to it by education and habit was put to any laborious employment, he would acquire the peculiarity of form that is common to thoſe who follow the ſame employ; if he perſevered in that employment to a greater degree than his ſtrength would enable him to ſupport, that peculiarity of form which is ſo produced, would, by the operation of debility occaſioned by exceſſive action, degenerate into poſitive deformity; and it is the faireſt induction to ſay, where there is ſuch a ſtate of parts as will permit a well-formed body to degenerate into a ſtate of deformity, the ſame ſtate of parts will allow the deformed body to return to its natural form, provided that adequate means can be employed and followed with a due degree of perſeverance till the deſired effect is produced. If due attention were paid to theſe facts, many caſes of lamentable deformity would be prevented, and many more would be cured that are now abandoned as irremediable.

" The diſeaſe which moſt frequently produces diſtortions of the ſpine and conſequent deformity is, that caries of the vertebræ which is generally attended with paralyſis of the lower extremities. As it is certain that the ſtability of our form, and much of our capacity to maintain the erect poſition, is the conſequence of the form and ſubſtance of the ſpine, it is equally evident, that any loſs of ſubſtance in the ſpine muſt weaken it in the direction of the part from which that ſubſtance is removed; the body will, of courſe, ſink in that direction. The muſcles, which are enabled to perform their natural functions in conſequence of their connection with the ſpine in its natural ſtate, become deranged in their action in conſequence of the altered ſtate of the ſpine; the parts above act upon it by the effect of gravity, the deranged action of the muſcles brings that gravity into action with accelerated force; and general deformity is the inevitable conſequence, unleſs effectual meaſures are taken to prevent it. But this is not all: the diſeaſe itſelf is increaſed, all the functions of life are impeded, and too frequently thoſe patients ſink irrecoverably under this diſeaſe, or if they do not, only partially recover, and paſs the reſt of their lives in a ſtate very little removed from that of continual illneſs.

"Mr. Pott, to whom the medical world uſually attribute the only ſucceſsful method of curing this diſeaſe *, having previouſly ſeen it treated as common curvature of the ſpine, with ſuch machinery as was uſed in the practice of that time, and always without ſucceſs, contracted a violent prejudice againſt all mechanical aſſiſtance; but now that further experience has enabled us to judge with more accuracy on the ſubject, there can be no doubt, that in almoſt every caſe of this kind, the moſt eſſential benefit may be derived from judicious mechanical aſſiſtance.

"What are the facts of the diſeaſe? - Caries; that is, ulceration in the bodies of the vertebræ, preceded and accompanied by inflammation in the parts immediately connected with them, is going on. This weakens the ſpine, and produces preſſure from the parts above upon it, and conſequent irritation in the diſeaſed parts, and aggravates all the ſymptoms of the diſeaſe: it is evident that this is the caſe, becauſe, according to the beſt ſurgical treatment of the diſeaſe, the patient is kept in bed during the cure, that the diſeaſed parts may be abſolutely at reſt.

"The ſucceſs of this practice affords the ſtrongeſt proofs that can be given of the miſchief that will be produced by the preſſure of thoſe parts which are ſituated above the diſeaſe; and if the patient is confined to his bed merely to avoid the conſequences of that preſſure, it may be fairly queſtioned whether the cure would not be further promoted by the uſe of ſuch mechanical contrivances as will obviate the effects of that preſſure, and leave the patient at liberty to receive all the additional benefit that he may derive from air, exerciſe, &c. Without attempting to diſcuſs this queſtion, however, it is proper to ſuggeſt another that is equally important.

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* Mr. Pott's name is generally affixed to this method of treating the diſeaſe, though he himſelf acknowledges that he received the idea of this method from Dr. Cameron, of Worceſter, who adopted it from Hippocrates.

" When the diſeaſe is eradicated, thoſe parts of the ſpine that have been ſeparated by the loſs of ſubſtance muſt be re-united. This muſt be effected, either by ſuffering the divided parts to come in contact with each other, or by keeping them ſeparate, till ſo much callus is formed as will ſupply the deficiency. In the former caſe, if the patient has been kept in bed, deformity has been prevented during the cure, but muſt come on afterwards, and will be proportioned to the quantity of ſubſtance that has been loſt, for the body will ſink till the parts that have been ſeparated come into contact with each other; and if the loſs of ſubſtance has been great, the deformity muſt be conſiderable; and by this circumſtance alone the patient's health may be materially affected. If it is determined to keep the parts ſuſpended till the deficiency is ſupplied by the formation of callus, mechanical aſſiſtance muſt be procured; and as, upon a candid reviſal of all the circumſtances of this diſeaſe, it appears that, in every caſe, deformity muſt come on, unleſs prevented by mechanical means, it may be ſuggeſted as a general rule to apply ſuch inſtruments as will moſt effectually ſupport the patient; which will not only prevent that deformity, but diminiſh the violence of thoſe ſymptoms which would have been conſequent to it, and have aggravated the diſeaſe.

" When diſtorted ſpine makes its appearance in conſequence of mere debility, it requires to be treated in the ſame manner ſo far as relates to mechanical aſſiſtance, i. e. the whole body ſhould be ſo ſupported that it cannot bend in any improper direction. If a patient ſo ſituated does not recover his natural ſtrength, no additional deformity will be produced; that which has taken place will be removed, and by the ſame means that were uſed to remove it, the patient may be ſupported for any length of time; but if he does regain ſtrength, his figure will be reſtored, and there will be no need of artificial ſupport."

Various means have been propoſed to effect this; we here add the deſcription of that invented by Mr. Sheldrake, and which he ſays he has long uſed with ſucceſs.

" The lower part of this inſtrument (ſee Pl. V.), which is the baſis of the whole, is a circle of ſteel made to fit the ſhape exactly, and go round the body, rather below the hips, and faſten before: on each ſide is a cavity made to fit each of the hips exactly: on the back of this is to be fixed a plate of ſteel, nearly as broad as the back itſelf, and quite as high as the ſhoulders; and in whatever part the curvature of the ſpine may lie, ſo much of the back muſt be cut away as will prevent any preſſure from being made on the diſeaſed part. On that part of the back which is next the ſhoulders two ſtraps ſhould be fixed, to go round the ſhoulders like the ſtraps of the common collar.

" To this back ſhould be fixed an upright piece of ſteel, which extends to the head, and paſſes round the back of the head, nearly as far as the temples: this ſhould be guarded ſo as to prevent its preſſure from hurting the head; it may be faſtened on the head either by a band round the forehead, or a ſtrap faſtened under the chin: we ſhould be directed by circumſtances in chooſing which of theſe modes ſhould be adopted.

"There are caſes in which it will be deſirable to carry the ſteel part *over* the head, like Le Vacher's machine, inſtead of under the occiput, as it is here directed; it has therefore been thought right to exemplify both methods in the engraved figures: Fig. 1, repreſents a back view of the inſtrument, with the ſupport under the occiput, and fig. 2, a profile view of the ſame inſtrument, with the ſupport paſſing over the head.

"It is evident that this inſtrument will anſwer every purpoſe that can be derived either for ſupport or extenſion. If that part which reſts upon the pelvis is properly adapted, it forms the firmeſt baſis for the whole to reſt upon. The head is, at the ſame time, well ſecured in the upper part, and thus effectually ſupported; at the ſame time, that it may be gradually raiſed ſo as to take off the weight or to produce any degree of extenſion the ſituation of the patient can admit of; at the ſame time that the body is left at perfect liberty, and reſpiration is not impeded, as it muſt be by thoſe contrivances that are fixed on ſtays of any kind."

The inſtrument repreſented is of the ſimpleſt form, as it perfectly explains the principle, but it is neceſſary to add, that it is poſſible to adapt them ſo exactly to the circumſtances of individual caſes, that they ſhall even conſtitute a part of the dreſs, ſometimes be concealed by it ſo effectually as to give the deformed perſon the appearance of a good ſhape, and thus act as a means of concealing the defect from the moſt intimate acquaintance, while at the ſame time the cure is going on.

SECT. II. *Of* CONTRACTIONS *of the* LIMBS, &c.

Contraction, called alſo by Dr. Aitkin, *beriberia*, is an immobility of any of the joints, induced by a preternatural contraction of ſome of the muſcles deſtined in a natural ſtate to move them; or from ſome derangement of the oſſeous or ligamentous parts about the joint affected.

Cullen ranks this as a genus of diſeaſe in the claſs Locales, and order Dyſcineſiæ, and defines it "a continued, rigid contraction, of one or more of the limbs." He diſtinguiſhes two ſpecies. 1. CONTRACTURA PRIMARIA, from a rigid contraction of muſcles, termed alſo *obſtipatis*: which word, with any other annexed, is only one or other variety of contracting: an inſtance is that known by the name of WRY-NECK, called *torticollis*. Of this ſpecies he forms four varieties. 1ſt. When the muſcles become rigid from inflammation. 2d. From ſpaſm. 3d. When contracted from the antagoniſts being paralytic. 4th. From irritating acrimony. 2. CONTRACTURA ARTICULARIS, from rigid joints. Theſe laſt are more particularly to be conſidered here.

Mr. Gooch mentions a caſe in which he cured a contraction of the neck without any operation. This, however, did not happen in conſequence of any natural defect of the conſtitution, but was occaſioned by a fall from an horſe, in a young woman. When brought to him, long after the accident, her chin was fallen upon her breaſt, and from the friction by an involuntary and conſtant vibrating motion, the ſkin was fretted off both theſe parts; which, with the pain ſhe ſuffered upon the poſterior part of her neck, made her life very uncomfortable. Various applications and bandages had been tried for two years to no purpoſe. He gave directions for making the machine repreſented in Pl. IV. fig. 86, by the uſe of which alone the relaxed parts recovered their tone and action, and ſhe was perfectly cured in ſix months. By the ſame contrivance he afterwards cured a ſimilar caſe of a year's ſtanding, except that the oſcillation of the head was not quite ſo much.

Dr. Aitkin obſerves, that joint contraction (as he terms the other kind) is moſt frequently ſymptomatic: and when it depends on muſcular contraction only, he adviſes the tepid bath, and deligation, and counteraction by weights, hung in due proportion, to oppoſe the contraction. Certain it is, that mechanical force, aſſiſted by vapour baths, and topical relaxants, has gradually ſucceeded in reſtoring contracted limbs to their proper poſition. The operations of Mr. Buzaglio, in this way, are, no doubt, remembered by many; and Mr. Pugh, a practitioner now in London, ſucceeds in the treatment of theſe caſes on ſimilar principles. The moſt novel and ingenious invention, however, for purpoſes of this nature, is Mr. Smith's *air-pump vapour-bath*, a view of which we have given in Plate V. The following accounts of it, and of the different purpoſes to which it ſeems to be applicable, are given in the Medical and Phyſical Journal, No. XXXVIII. by Dr. Hamilton and Mr. Blegborough:

" As the machine," ſays Mr. Blegborough, " comprehends, and, for the firſt time, combines the application of *fomentation* and the *cupping-glaſs*, two of the moſt powerful external means of acting on diſeaſe, and that more extenſively than ever was before thought of; what effects may we not be led to expect from ſo extended a combination? Every day's experience is proving to us the efficacy of the application in gout, rheumatiſm, *contractions of muſcles*, cutaneous and other diſeaſes, particularly of the chronic kind; and though its application has not yet been ſo extenſive, under my own immediate inſpection, as to warrant my affirming it to the extent, I hope to be ſoon able to do; nevertheleſs I have reaſon to believe, from ſome recent caſes, that acute diſeaſes alſo are not beyond the reach of its influence, and that from its power in promoting a copious diaphoreſis and relaxation of the whole ſyſtem, it may be made to produce the happieſt effects in phrenitis, pleuritis, enteritis, &c.

"The peculiar conſtruction of the machine before us is adapted to the leg or arm only, but the principle extends much further, and can be applied to any part of the body by the intervention of glaſſes, or otherwiſe. One is already made that includes one half of the body; and when we conſider that by its means the preſſure of the atmoſphere can be removed from ſo large a ſurface, every ſquare inch of which ſuſtains a weight of 15lb. the effects on the veſſels circulating the fluids in ſuch parts are too evident to need inſiſting on in this paper. One very obvious one is, that the conſequent temporary expanſion of them from ſo great a preſſure being removed, muſt give an opportunity for obſtructions formed in them to give way, at the ſame time arreſting the progreſs of inflammation, the means which Nature, left to herſelf, is under the neceſſity of employing to bring about the ſame end. In this manner is avoided a great deal of miſery ariſing from ſymptomatic fever, &c. and not unfrequently deſtruction of parts, the conſequence of ſuppuration."

Dr. Hamilton, phyſician to the London Diſpenſary, who accidentally ſaw the effects produced by its application, ſpeaks of it, in a letter to Mr. Smith, of Brighton, the inventor, in the following terms:

"The mode in which it muſt act is agreeable to ſound theory, and the more it is put in practice, the oftener will facts occur to confirm what I now ſay. I not only view it as valuable to remove local affections of the extremities, but alſo to afford relief in other parts of the body, where obſtructions may have taken place. There are ſome complaints which would often be greatly mitigated, if not always removed, by its power in producing a general and copious ſweat over the whole frame, ſuch as in the diabetes, dropſy, and other maladies where the ſkin is parched, dry, and hard. In general, it will be well to pump out the air gradually, and to ſee the effects of a partial exhauſtion of the machine; for its being done too ſuddenly, will allow the air in the circulating fluids to exert its ſpring with too great force, producing acute pain, &c."

Though this is the firſt drawing that has been made of it, or the firſt time any thing has appeared concerning it in print, yet the credit of it is by no means to eſtabliſh. "It is too well founded in philoſophy," ſays Mr. Blegborough, "not to have attracted the attention of medical men, ſome of whom, high in their profeſſion, have not only recommended it to their patients, but have had it applied to their own perſons with the moſt marked benefit. Many valuable caſes are already in my poſſeſſion, ſome of them of perſonages of the firſt conſideration in the kingdom; but as it is my intention to publiſh an account of them, I ſhall content myſelf at preſent with ſimply ſtating its principles, and leave it with profeſſional readers to draw their own concluſions." We certainly ſo far agree with the gentlemen who have thus introduced this promiſing invention into notice, as to conſider it well worth the attention of the medical practitioners. The following explanation of the figure of this machine will make its operations better underſtood.

Fig. 1. A view of that end of the machine to which the exhauſter, &c. are fixed. (A) the body of the machine. (B) the boiler, containing the fluid, the fumes of which are thrown into the machine through the ſtop-cock (H), and heated by means of (C) a ſpirit lamp. (D) the valve in the boiler for the eſcape of the fumes when prevented entering into the machine by turning the ſtop-cock (H). (E) a thermometer, ſhewing the temperature of the fumigation. (F) the exhauſter; for exhauſting the machine after the fumigation has continued a proper time, 40 ſtrokes of which are as many as any perſon can bear at once. (G) the eſcape valve of the exhauſter; to which a flexible pipe is adapted to convey the air from the chamber, if vitiated by the nature of the affection for which the application is made. (H) the ſtop-cock. (I) another, to prevent the valves of the exhauſter from being injured by the hot fumes as they enter the machine during the fumigation.

Mr. Smith, of Brighton, claims the merit of its invention, and has, by occaſional alterations, in the ſpace of ſome years, brought it to its preſent ſtate of ſimplicity and perfection. The idea of ſucking poiſon from wounds firſt led him to believe that mechanical means might be employed on the ſame principle to a great extent. How far the intention is anſwered by the air-pump vapour-bath, and how extenſive the application of it may be made in the treatment of diſeaſe, the public are to be the judges.

Whether the object of the preſent ſection will be promoted by the operation of the air-pump in conjunction with the relaxing effects of warm vapour applied to contracted limbs, remains to be determined by the gentlemen who have made trial of the machine.

SECT. III. *Of* SQUINTING.

Squinting is a well-known deformity, ariſing, in moſt caſes, from a preternatural contraction of one or more of the muſcles of the eye. By this means, the axis of the pupil is drawn towards the noſe, temples, forehead, or cheeks, ſo that the perſon cannot behold an object directly.

1. This diſeaſe may proceed from cuſtom and habit; while in

the eye itſelf, or in its muſcles, nothing is preternatural or defective.

Thus children, by imitating thoſe that ſquint, and infants, by having many agreeable objects preſented to them at once, which invite them to turn one eye to the one and the other eye to another, do frequently contract a habit of moving their eyes differently, which afterwards they cannot ſo eaſily correct. Infants likewiſe get a cuſtom of ſquinting by being placed obliquely towards a candle, window, or any other agreeable object capable of attracting their ſight: for though, to ſee the object, they may at firſt turn both eyes towards it; yet, becauſe ſuch an oblique ſituation is painful and laborious, eſpecially to the moſt diſtant eye, they ſoon relax one of the eyes, and content themſelves with examining it with the eye that is next it, whence ariſes a diverſity of ſituation, and a habit of moving the eyes differently.

In this caſe, which may admit of a cure, if not too much confirmed, it is evident, that objects will be ſeen in the ſame place by both eyes, and therefore muſt appear ſingle as to other men; but becauſe in the eye that ſquints, the image of the object to which the other eye is directed falls not on the moſt ſenſible and delicate part of the retina, which is naturally in the axis of the eye, it is eaſy to ſee that it muſt be but faintly perceived by this eye. Hence it is, that while they are attentive in viewing any object, if the hand be brought before the eye, this object will be but obſcurely ſeen, till the eye change its ſituation, and have its axis directed towards it; which change of ſituation is indeed very eaſy for them, becauſe it depends on the muſcles of the eyes, whoſe functions are entire; but, by reaſon of the habit they have contracted of moving their eyes differently, the other eye is, at the ſame time, frequently turned aſide, ſo that only one at a time is directed to the object.

That all this may be the better perceived, for an object, cauſe them to look at the image of the upper part of your noſe in a plane mirror, while you ſtand directly behind them, to obſerve the direction of their eyes.

2. The *ſtrabiſmus* may proceed from a fault in the firſt conformation, by which the moſt delicate and ſenſible part of the retina is removed from its natural ſituation, which is directly oppoſite to the pupil, and is placed a little to one ſide of the axis of the eye; which obliges them to turn away the eye from the object they would view, that its picture may fall on this moſt ſenſible part of the organ.

Whenever this is the caſe, the diſeaſe is altogether incurable, and the phænomena that ariſe therefrom differ in nothing from the phænomena of the former caſe, excepting only that here, 1. The object to which the eye is not directed will be beſt ſeen; which is the reverſe of what happens when the diſeaſe ariſes barely from habit or cuſtom. 2. No object will appear altogether clear and diſtinct; for all objects to which the eye is directed, by having their image painted in the retina at the axis of the eye, where it is not very ſenſible, will be but obſcurely ſeen; and objects that are placed ſo far to one ſide of the optic axis as is neceſſary for making their image to fall on the moſt ſenſible and delicate part of the retina, muſt appear a little confuſed, becauſe the ſeveral pencils of rays that come therefrom fall too obliquely on the cryſtalline to be accurately collected in ſo many diſtinct points of the retina: though it muſt be acknowledged, that this confuſion will, for the moſt part, be ſo ſmall as to eſcape unobſerved.

3. This diſeaſe may proceed from an oblique poſition of the cryſtalline, where the rays that come directly to the eye from an object, and that ought to converge to the point of the retina, which is in the axis of the eye, are, by reaſon of the obliquity of the cryſtalline, made to converge to another point on that ſide of the viſual axis where the cryſtalline is moſt elevated; and, therefore, the object is but obſcurely ſeen, becauſe its image falls not on the retina at the axis of the eye, where it is moſt ſenſible: but the rays that fall obliquely on the eye, will, after refraction, converge to this moſt ſenſible part of the retina; and, by converging there, muſt impreſs the mind with a clearer idea of the object from whence they came. It is for this reaſon that the eye never moves uniformly with the other, but turns away from the object it would view, being attentive to the object to which it is not directed. When this is the caſe, it is in vain to expect any good from ſurgery.

The ſymptoms that naturally ariſe from it are, 1. The object to which the eye is directed will be but faintly ſeen, becauſe its image falls on the retina where it is not very ſenſible. 2. The object to which the eye is not directed, by having its image painted on the retina at the axis of the eye, will be clearly perceived. But, 3. This ſame object muſt appear ſomewhat indiſtinct, becauſe the pencils of rays that flow from it are not accurately collected in ſo many diſtinct points in the retina, by reaſon of their oblique incidence on the cryſtalline. 4. It muſt be ſeen, not in its proper place, but thence tranſlated to ſome other place ſituated in the axis of viſion. And, 5. being thus tranſlated from its true place, where it is ſeen by the other eye that does not ſquint, it muſt neceſſarily appear double; and the diſtance between the places of its appearance will be ſtill greater, if the cryſtalline of the other eye incline to the contrary ſide.

4. This diſeaſe may ariſe from an oblique poſition of the cornea; which in this caſe is generally more arched and prominent than what it is naturally.

When the eye has this conformation, no object to which it is directed can be clearly ſeen, becauſe its image falls not on the retina at the axis of the eye; and, therefore, the eye turns aſide from the object it would view, that its image may fall on the moſt ſenſible part of the retina.

When the ſtrabiſmus proceeds from this cauſe, the prognoſtic and the phænomena that attend it will be much the ſame as in the caſe immediately preceding; from which nevertheleſs it may be diſtinguiſhed by the obliquity of the cornea, which is manifeſt to the ſenſes; and if the cornea be alſo more arched and prominent than what it is naturally, which is commonly the caſe, the eye will alſo be ſhort-ſighted.

5. This want of uniformity in the motion of our eyes, may ariſe from a defect, or any great weakneſs or imperfection, in the ſight of both or either of the eyes; and this, according to Dr. Porterfield, is the moſt common cauſe of this diſeaſe. The prognoſtic in this caſe is the ſame with that of the diſeaſe from which it proceeds.

6. Another cauſe from which the ſtrabiſmus may proeeed, lies in the muſcles that move the eye. When any of thoſe muſcles are too ſhort or too long, too tenſe or too lax, or are ſeized with a ſpaſm or paralyſis, their equilibrium will be deſtroyed, and the eye will be turned towards or from that ſide where the muſcles are faulty.

In this caſe the diſeaſe frequently yields to medicine, and therefore admits of a favourable prognoſtic; excepting only when, by a fault in the firſt conformation, any of the muſcles are longer or ſhorter than their antagoniſts; in which caſe, if ever it ſhould happen, no medicine can be of any uſe.

As to what concerns the optical phænomena, they are the ſame here as in caſe firſt: only when the diſeaſe commences not till, by cuſtom and habit, the uniform motion of the eyes has been rendered neceſſary, all objects do for ſome time appear double; but in time they appear ſingle.

7. This want of uniformity in the motions of our eyes may proceed from a preternatural adheſion or attachment to the eyelids: of this we have an inſtance in Languis. And that the ſame thing may alſo be occaſioned by a tumor of any kind within the orbit, preſſing the eye aſide, and reſtraining it from following the motions of the other, is ſo evident, that inſtances need not be brought to prove it. Here alſo the caſe may admit of a favourable prognoſtic; and as for what concerns the optical phænomena, they muſt be the ſame as in the caſe immediately preceding.

In confirmed caſes, the cure is to be effected by mechanical contrivances, by which the perſon may be obliged to look ſtraight upon objects, or not ſee them at all; or at leaſt that he may ſee with uneaſineſs and confuſedly when he ſquints. In the 68th volume of the Philoſophical Tranſactions we have an account of a confirmed caſe of ſquinting of a very uncommon kind. The patient was a boy of five years old, and viewed every object which was preſented to him with but one eye at a time. If the object was preſented on his right ſide, he viewed it with his left eye; and if it was preſented on his left ſide, he viewed it with his right eye. He turned the pupil of that eye which was on the ſame ſide with the object in ſuch a direction, that the image of the object might fall on that part of the bottom of the eye where the optic nerve enters it. When an object was held directly before him, he turned his head a little to one ſide, and obſerved it with but one eye, viz. that moſt diſtant from the object, turning away the other in the manner above deſcribed; and when he became tired of obſerving it with that eye, he turned his head the contrary way, and obſerved it with the other eye alone, with equal facility; but never turned the axes of both eyes on it at the ſame time. He ſaw letters which were written on bits of paper, ſo as to name them with equal eaſe, and at equal diſtances, with one eye as with the other. There was no perceptible difference in the diameters of the iriſes, nor in the contractility of them after having covered his eyes from the light. Theſe obſervations were carefully made by writing ſingle letters on ſhreds of paper, and laying wagers with the child that he could not read them when they were preſented at certain diſtances and in certain directions.

As from theſe circumſtances it appeared that there was no defect in either eye, which is frequently the caſe with perſons who ſquint, and hence that the diſeaſe was ſimply a depraved habit of moving his eyes, the diſeaſe ſeemed capable of a cure. A paper gnomon was made for this purpoſe, and fixed to a cap; and when this artificial noſe was placed over his real noſe ſo as to project an inch between his eyes, the child, rather than turn his head ſo far to look at oblique objects, immediately began to view them with that eye which was next to them. But having the misfortune to loſe his father ſoon after this method was begun to be followed, the child was neglected for ſix years, during which time the habit was confirmed in ſuch a manner as ſeemed to leave little room to hope for a cure. The ſame phyſician, however, being again called, attempted a ſecond time to remove the deformity by a ſimilar contrivance. A gnomon of thin braſs was made to ſtand over his noſe, with a half circle of the ſame metal to go round his temples: theſe were covered with black ſilk, and by means of a buckle behind his head, and a croſs-piece over the crown of his head, this gnomon was worn without any inconvenience, and projected before his noſe about two inches and a half. By the uſe of this machine he ſoon found it leſs inconvenient to view all oblique objects with the eye next to them inſtead of the eye oppoſite to them.

After this habit was weakened by a week's uſe of the gnomon, two bits of wood, about the ſize of a gooſe-quill, were blackened all but a quarter of an inch at their ſummits; theſe were frequently preſented to him to look at, one being held on one ſide the extremity of his black gnomon, and the other on the other ſide of it. As he viewed theſe, they were gradually brought forwards beyond the gnomon, and then one was concealed behind the other: by theſe means, in another week, he could bend both his eyes on the ſame object for half a minute together; and by continuing the uſe of the ſame machine, he was in a fair way of being cured when the paper was written.

Dr. Darwin, who writes the hiſtory of the above caſe, adds, that all the other ſquinting people he had occaſion to attend, had one eye much leſs perfect than the other: theſe patients, ſays he, are certainly curable by covering the beſt eye many hours in a day, as by a more frequent uſe of the weak eye, it not only acquires a habit of turning to the objects which the patient wiſhes to ſee, but gains at the ſame time a more diſtinct viſion; and the better eye ſeems to loſe ſomewhat in both theſe reſpects, which alſo facilitates the cure.

Thoſe who have occaſion to treat caſes of ſtrabiſmus will do well to conſult the curious papers of Mr. Home, on the means by which the pupil of the eye adapts itſelf to nearer or more remote objects, in the Philoſophical Tranſactions for 1800.

CHAP. XXXVIII. OF DIMINISHING PAIN IN SURGICAL OPERATIONS.

THE pain induced by ſurgical operations may be leſſened in two different ways. The firſt is, by diminiſhing the natural ſenſibility of the ſyſtem; and for this purpoſe narcotics of different kinds, and particularly opium, have been uſed; but theſe are apt to induce diſagreeable ſymptoms, eſpecially ſickneſs and vomiting, which might be attended with bad conſequences after ſome operations. They are therefore ſeldom employed before an operation. When, however, they are given immediately after it, and repeated as circumſtances may require, they often give great relief.

The other method of diminiſhing pain is, by leſſening the ſenſibility of a particular part of the body. It has long been known, that the ſenſibility of any part may not only be leſſened, but entirely ſuſpended, by compreſſing the nerves which ſupply it. From a knowledge of this circumſtance, an inſtrument (fig. 101) was invented ſome years ago by Mr. James Moore of London, by which the principal nerves of a member might be ſo compreſſed as to render the parts below perfectly inſenſible. A difficulty, however, ariſes here; for as the nerves muſt be compreſſed at leaſt an hour previous to the operation, in order to render the parts quite inſenſible, and as it is extremely difficult to compreſs the nerves without at the ſame time affecting the veins, the latter are therefore in danger of being burſt. To prevent this inconvenience, Mr. Moore propoſes to open a vein; but this might be attended with bad conſequences in weakly conſtitutions. Beſides, it is ſaid, that by compreſſing the nerves in this manner, although leſs pain may be felt in the time of the operation, it is proportionally greater after the compreſſion is removed. In certain parts of the body, however, where ſufficient compreſſion can be made upon the nerves without acting much upon the veins, it would appear that this method may be practiſed with advantage; though it has not yet been done, except in a very few inſtances.

CHAP. XXXIX. OF BANDAGES.

THE proper application of bandages is an object of great importance in ſurgery: and though dexterity is only to be acquired in this branch by practice, yet a few general rules may be found uſeful. Bandages are employed for the retention of dreſſings, for ſtopping hæmorrhages, for removing deformities, and for effecting the union of divided parts. They ought to be formed of ſuch materials as are ſufficiently firm, while, at the ſame time, they give no uneaſineſs to the parts to which they are applied. They may be compoſed either of linen, cotton, or flannel. Of late years the two laſt have been preferred by many for their warmth and elaſticity, on which account they are certainly moſt proper, eſpecially in winter; and likewiſe in caſes where the parts are liable to ſwelling and inflammation, as in wounds, luxations, and fractures. Beſides, they more readily abſorb any moiſture which may be diſcharged from the ſores.

When firſt applied, they ſhould be clean, ſufficiently ſtrong, and as free of ſeams as poſſible. They ſhould be ſo tightly applied as to anſwer the purpoſe for which they are intended, without being in danger of impeding the circulation. They ſhould be applied in ſuch a manner that they may be eaſily looſened, and the parts examined with as much accuracy as poſſible; and they ſhould be laid aſide as ſoon as the purpoſe for which they are intended is accompliſhed; for when longer continued, they frequently impede the growth of the parts upon which they are applied.

With reſpect to bandages for particular parts, we ſhall begin with *the head*, and then proceed to the trunk and extremities. The *couvre chef* of the French, which is a ſquare napkin folded cornerwiſe, is moſt frequently uſed where the bandage is wanted for the head; but a nightcap, having a band to go round the head, and another to tie under the chin, appears to be more ſuitable for this purpoſe. For making compreſſion on any particular part of the head, as for ſtopping of bleeding veſſels, the radiated bandage may be employed.

For keeping the edges of wounds together, as in caſes of longitudinal cuts of the head, or of any other parts, the uniting bandage is uſually employed, and is always to be preferred to ſuture, where it retains the edges of the wound with ſufficient exactneſs. To retain dreſſings upon the eyes, ſeveral turns of a roller have been uſed, and it is termed *monoculus* or *binoculus*, according to its being applied to one or both eyes: but the *couvre chef*, and the nightcap already mentioned, are leſs apt to ſlip, and therefore found more convenient for this purpoſe.

For fractures of *the noſe*, or wounds there, or on any other part of the face, the uniting bandage anſwers beſt. And in caſes of fracture of the lower jaw, a four-headed roller is moſt convenient: the hole in the centre of the roller receives the chin, and aſſiſts in preventing the bandage from ſhifting. The two upper heads are to be carried backwards; and being made to paſs each other at the occiput, they are afterwards brought once or twice round the head. The two under heads of the roller being reflected over the chin, are then to be turned upwards and fixed on the upper part of the head.

The bandages neceſſary for *the neck* are, the machine already mentioned after the operation of bronchotomy, and one uſed in caſes of wry neck. For every other purpoſe of bandaging, a common roller may anſwer perfectly well.

For fractures of the ſcapula, the application of a long roller may be of ſervice.

For retaining dreſſings upon *the thorax*, the napkin and ſcapulary are commonly, and very properly, uſed; and when the napkin is employed merely for retaining dreſſings, it need not be longer than to paſs once round the body; but if it be uſed for making preſſure over a fractured rib, it ought to paſs two or three times round. For both purpoſes its breadth ought to be three or four inches for an adult.

The ſame kind of bandage is alſo uſed for making preſſure on the abdomen, as in caſes of umbilical or ventral hernia; and to keep the bandage properly placed, a ſcapulary is uſed for preventing it from ſlipping down, and one or two ſtraps connected with it behind, are brought between the thighs, and fixed to it before, to prevent it from moving up. A bandage of flannel, and different kinds of belts, are contrived for compreſſing *the abdomen* in the operation of tapping; and truſſes of various conſtructions are uſed for the retention of the protruded bowels in caſes of hernia.

Bandages of cotton or flannel are uſed for ſupporting *the ſcrotum* in the various diſeaſes which may occur there, as well as after the operations performed upon it.

One of the beſt bandages for *the penis* is a linen or cotton bag, fixed by a roller round the body.

For retaining dreſſings about *the anus*, or between that part and the ſcrotum, the T bandage is commonly uſed; and it is made either with one or two tails, according to the ſituation of the part to which it is to be applied.

In ſimple fractures, and moſt other diſeaſes of the arm, fore-arm, and hand, the roller is the bandage commonly uſed; but in compound fractures of theſe parts, as well as in the different kinds of fractures of the lower extremities, the twelve or eighteen tailed bandage is neceſſary.

For longitudinal wounds of the extremities, the uniting bandage is uſed with the ſame advantage as has been already mentioned for wounds of a ſimilar nature upon the head.

CHAP. XL. ON DISSECTION.

SECT. I. *Of the* OBJECTS *to be attended to in* DISSECTIONS.

WE have, in enumerating the ſeveral *qualifications requiſite* to *make a good ſurgeon* (ſee vol. III. p. xxxix), dwelt on the importance of his availing himſelf of every opportunity that offers, of diſſecting, and of opening dead bodies with a view to become acquainted with their diſeaſes. We ſhall here preſent the reader with the ſentiments of Mr. C. Bell, a late writer on the ſubject, which will ſerve to direct the judgment in this purſuit. He ſays,

"From what I have ſeen of private diſſection, I would rather adviſe thoſe who are deſirous of undertaking a complete courſe of diſſections, not to begin their labours with learning all the muſcles of the body; for this, beſides other diſagreeable circumſtances, is a dry and tedious taſk at firſt.—It will perhaps be found more truly uſeful to begin their diſſections with general views to the economy of ſuch parts as, from lectures or books, they know to be of importance; then proceeding, in a more determined way, to ſtudy rigidly the anatomy of the bones and muſcles, and accidents of the great joints,—the blood-veſſels and nerves, and the anatomy of the great operations of ſurgery.

"During diſſection, there are many little operations which ſhould be practiſed, and which are neglected. The introducing, for example, of probes into the ducts; as into the naſal duct, and into the ducts of the ſalivary glands: the introducing of inſtruments into the noſe and throat, and into the Euſtachian tube: the uſe of the probang, and of the catheter, &c.—Knowledge and dexterity in ſuch points often prove more uſeful, as being oftener required, than the greater operations of ſurgery."

After a nice deſcription of the mode of diſſecting the abdominal muſcles, the *linea alba*, the *linea ſemilunaris*, &c. the author gives the following judicious directions on hernia, dropſy, and aſcites, as connected with the anatomy of theſe muſcles.

" It is wrong to cut acroſs the belly in opening collections of matter amongſt theſe muſcles, unleſs they have been deſtroyed by the matter; becauſe the fibres of the muſcles are then cut acroſs, hence they retract, and form a gap; and at the ſame time the poſſibility is increaſed of wounding the epigaſtric artery which runs up the belly. By opening theſe abſceſſes with an inciſion parallel to the fibres of the muſcles, the parts are divided, without allowing the muſcles to retract; and the chance of wounding the arteries is leſſened. In tapping for the dropſy, it is ſaid that the epigaſtric artery (the courſe of which I have marked in the plate with a dotted line) is ſometimes wounded, or its accompanying vein. But it ſhould be expected, when theſe were wounded, that while the canula remained in the wound, diſtending the orifice, they ſhould not bleed. If they ſhould bleed, however, they may probably be ſtopped by preſſing the canula obliquely to one ſide. I have never ſeen an accident of this kind; but ſuch caſes have been deſcribed to me, where the deluge of waters was coagulated in the tub. Perhaps an enlarged ſpleen, or ſome of the viſcera touched with the trochar, may ſometimes account for ſuch a bleeding."

The author's directions for the mode of opening the abdomen, to inveſtigate the ſeat of diſeaſe, are clear and ſimple. Theſe are the ſtages: " Make a crucial inciſion. at once laying open the viſcera—or, if in a female, make your inciſion ſo as to leave a triangular flap to fall over the parts of generation, by continuing your longitudinal cut no further than the umbilicus, and from that point, making an oblique inciſion on each ſide, towards the projecting point of the ilium, forming thus three triangular flaps. Then obſerve whether the parts are in their natural ſituation: examine the omentum, the ſtomach, the ſpleen, the inteſtines, and then the liver and gall ducts. Then ſeparating the ſtomach and colon, connected by the omentum, raiſe the ſtomach, and examine the pancreas.—Cutting up the adipoſe membrane, examine the kidneys, by making a ſection of them. Then following the ureters, examine the contents of the pelvis, &c. In making up your caſe, firſt mark the general deviations from the healthy appearance of the viſcera; then detail the hiſtory of the diſeaſe, and take notice of any anomalous appearances which ſeem unconnected with the principal diſeaſe.

" On this ſubject (diſeaſe of the abdominal viſcera) it is of importance to ſtudy the nature of inflammation, of adheſions, and ſuppuration, and the almoſt uniform conſequence of diſeaſe upon the peritoneum. It will be eaſy, when this knowledge is acquired, to unravel the diſeaſed viſcera, which, without it, muſt appear confuſed and intricate.

" Active inflammation ſhould be diſtinguiſhed from turgidity of the veſſels; for often a fulneſs of the veins, mechanically produced, is deſcribed as an active inflammation in the brain and in the pleura, and ſtill oftener in the abdomen. In dropſy, in violent diſtenſion of the inteſtines, in tympanites inteſtinalis, and after child-bearing, the veins of the inteſtines and peritoneum are often found diſtended with blood. But in real inflammation, the peritoneum becomes thickened, pulpy, and leſs tranſparent—the blood is alſo of a brighter red colour; a circumſtance which ſeems not to be owing to a peculiar property in the inflamed part, of preſerving the arterial colour of the blood (as Mr. Hunter ſuggeſts), but to its more general ſuffuſion.

" As the eye becomes dry and painful and inflamed when the eye-lids are forcibly kept open and prevented from ſpreading the ſecretion upon its ſurface; ſo, when the enveloping membrane of the viſcera is expoſed, the natural ſecretion of its ſurface is deſtroyed, and it is irritated and inflamed. Or, by inflammation from any other cauſe, the ſecretion is deſtroyed; the parts lying in contact are no longer kept ſeparate; they mutually affect each other; and, producing a new action, unite.

" Adheſions are produced in the peritoneum and inteſtines in a wonderfully ſhort time; and the ſmooth membrane, when it is torn from its new connections, appears cellular; or, upon being cut, thickened, and ſolid—or if the ſurface have undergone ſevere inflammation (without being allowed to form theſe adheſions, which are ſo frequently the conſequence of inflamed peritoneum), its ſurface becomes ragged, and numerous floculi of new membranes are formed upon it.

" In diſeaſes where inflammation has ſpread among the viſcera, it is generally underſtood that the peritoneum is the original ſeat of the inflammation.—And, according to this view of the ſubject, it appears upon diſſection, that the inteſtines do more readily than the muſcles participate in the inflammation of the peritoneum. The muſcles are indeed guarded in ſome meaſure by the looſe cellular ſubſtance, which ſeparates them from the peritoneum. But this does not ſatisfactorily account for what, in the above view, appears to be ſo great a difference between the ſympathy of the inteſtines and that of the muſcles with the peritoneum. The true explanation ſeems to be, that the diſeaſe or inflammation is in general communicated, not from the peritoneum to the inteſtines, but from the inteſtines to the peritoneum.—It is the diſeaſe of the inteſtines which produces thoſe deadly ſymptoms that are ſaid to mark inflammation of the abdominal cavity; and although there are diſeaſes in which the peritoneum is peculiarly the ſeat of inflammation, yet the inflammation of the peritoneum, produced by any external cauſe, is dangerous only by propagating its inflammation to the inteſtines."

The author's obſervations on the *ſtomach*, *duodenum*, and *liver*, are as follow:

" In examining the body," ſays he, " it will be obſerved how the ſtomach and ſpleen may be wounded by a thruſt apparently into the thorax; or how the lungs and ſtomach, or lungs and liver, may be thruſt through at once. It may alſo be obſerved how the ſtomach and liver lie before the diaphragm, where it goes obliquely down upon the back part of the abdomen; and how they lie contiguous to one another. The effect of hydrothorax, in puſhing down the diaphragm, and depreſſing theſe parts—and the effect alſo of enlargement of the liver, or diſtenſion of the ſtomach upon the breathing, muſt be obvious. It will alſo be ſeen how a hernia of the ſtomach into the thorax may happen by a rupture of the diaphragm.

" The ſtomach is commonly retired behind the colon, and under the ribs. Yet when ſlightly diſtended, it comes further down in the belly, and aſſumes the place of the arch of the colon. Therefore finding a patient with an open ulcer immediately under the ſcrobiculus cordis, diſcharging the contents of the inteſtines (an inſtance of which I have lately ſeen), it may be queſtioned whether it be an opening from the ſtomach or from the colon. This may perhaps be determined by obſerving the matter diſcharged, whether it be food partly digeſted, as from the ſtomach; or fæces, as from the colon, after having gone through the whole length of the canal.

" Ulceration of the inner coats, and cancerous tumors, of the ſtomach, are frequent. Upon the inſide of the ſtomach, inteſtines, and bladder, when violently inflamed by any irritation, there is often a general redneſs with bloody ſlime, or there are ſmall blots of florid extravaſation. The few caſes of cancerous tumors of the ſtomach which I have ſeen, accord with the common obſervation, that the upper orifice of the ſtomach is more liable to diſeaſe (owing to its more glandular ſtructure), and more expoſed to injury from ſubſtances ſwallowed. I have ſeen the whole upper half of the ſtomach, with its walls ſo much diſeaſed, that they were not leſs than one inch in thickneſs, with their inner ſurface ſoft and cancerous. This diſeaſe was attended, during the patient's life, with a continual gnawing pain, with ſoreneſs even upon taking the ſofteſt food, and with extreme pain upon ſwallowing any thing, in the ſlighteſt degree ſtimulating. In diſeaſes of this kind, and where there are tumors projecting into the ſtomach, there is frequent vomiting of black chocolate-coloured blood, which is often attended with fainting.

" Contractions of the œſophagus, and upper orifice of the ſtomach, are frequent without any organic diſeaſe. When there is diſeaſe of the œſophagus, the ſtomach is found contracted in breadth, and ſcarcely to be diſtinguiſhed from the inteſtines (Haller); but it is ſaid, that when the diſeaſe is lower down, the ſtomach is found to be diſtended. I do not know whether this laſt obſervation holds good. The ſtomach, however, is often diſtended ſo as to fill almoſt the whole belly, without any other extraordinary appearance. And in theſe caſes, the ſmall inteſtines being compreſſed, obſtinate coſtiveneſs is induced.

" That the coats of the ſtomach are affected by its own juices, is now univerſally believed. But, as far as I have obſerved, eroſion is not in ſuch caſes to be expected. Nor are the coats thinner, but they are thickened, gelatinous, yielding, and tender to the fingers; a circumſtance that has often troubled me in injecting the veſſels of the ſtomach. That this is produced by the ſecreted fluid of the ſtomach, unaſſimilated with the food, we are aſſured from the inteſtines not being thus affected, though in the ſame circumſtances with regard to putrefaction. Although it be a common and well-founded obſervation, that the ſtomach is extremely delicate, and although the inſtances of ſudden death occaſioned by blows upon it are very frequent, yet there are ſome caſes that would ſeem to form exceptions to this. A young man received a kick in the belly from a horſe. It occaſioned long a conſtant pain in the fore part of the belly, weakneſs and indigeſtion; theſe were ſucceeded by a tedious hectic fever, and at laſt proved fatal. Upon diſſection, the omentum was found folded up and contracted round the ſtomach, forming a ſolid maſs of about an inch and a half in thickneſs, and connecting the ſtomach and inteſtines and liver by its adheſions. The ſtomach itſelf was turned to a bloody grumous cancer. The outlines of this caſe will point out the difficulties which will ſometimes occur in unravelling theſe parts when diſeaſed.

" Obſerve the ſituation of the liver towards the right ſide; how far it comes down into the right hypochondrium; and how dangerous and improper it conſequently is to tap on this ſide, the more eſpecially as the liver is often enlarged in dropſy. Obſerve, again, the cloſe connection of the liver with the diaphragm, and how abſceſſes, originally formed in the liver, may, by the ſpreading of the inflammation, and by the adheſions with the diaphragm, communicate the ſuppuration to the lungs, ſo that the matter from the liver may be coughed up from the breaſt; or how hydatids, originally formed in the liver, may, by the ſame communication, be coughed up from the lungs; or how matter in the liver may, by its natural tendency to the ſurface, propagate the inflammation to the abdominal muſcles, and, by forming adheſions with them, be diſcharged outwardly. In this laſt caſe the adheſions, always preceding the formation and progreſs of matter outwardly, the attachment of the liver and integuments is cloſe and intimate, and the abſceſs points regularly, ſo that the operation is very eaſy. Abſceſs of the liver, beſides being attended with a peculiar painful feeling in the right hypochondrium, is accompanied with a ſharp pain of the ſhoulder and clavicle of the ſame ſide; yet it ſometimes happens, that the liver is ſo little ſenſible, that upon diſſection, there are found great abſceſſes where the patient, during life, had no complaint. There are, in the writers upon the diſeaſes of hot climates, ſome ſtrange examples of the extenſive communications of theſe abſceſſes.

" After having obſerved the intimate connection of the liver, duodenum, and ſtomach, it is eaſy to conceive a caſe which not unfrequently happens, viz. a diſcharge of matter into the ſtomach and inteſtines, and even a diſcharge of the food by the external wound, after an operation for abſceſs of the liver; for it has happened, that the abſceſs of the liver has formed connections with the ſtomach on the one hand, and, on the other, opened outwardly upon the ſide of the belly. It will alſo be ſeen how hydatids, getting entangled with the inteſtines, may be diſcharged by ſtool; and how tumors of the liver, pancreas, and ſpleen, muſt oppreſs the ſtomach.

" With regard to the operation for the collections of matter in the liver, unfortunate miſtakes have been made. There is a caſe mentioned by Haller, of what he calls a ſpurious aneuriſm, in which, upon the tenth rib below the ſcapula, and in the muſcular fleſh of the back, there ſeemed to be the pointing of an abſceſs, which yielded to the fingers; the patient having at the ſame time a ſlow fever, and a jaundiced complexion. They had no doubt of its being an abſceſs of the liver; but the patient died of the violent hæmorrhagy the night following the operation. There is another caſe which brings home to us ſtill more forcibly the importance of an accurate knowledge of theſe parts, and of a lively conception of the effects of diſeaſe upon them. In l'Hôpital de la Charité, in Paris, the operation for empyema was performed, but no matter flowed from the inciſion. They had been deceived chiefly by the circumſtance of matter being ſpit up from the lungs. Upon diſſection, they found that the matter had been originally formed in the liver, and from it had been communicated to the lungs; but that this communication, having been formed deep in theſe viſcera, no matter could flow from the inciſion. In Ruyſch, there is another caſe of a country ſurgeon cutting into the liver, when operating for paracenteſis of the thorax; and the caſe ſhews, at the ſame time, the poſſibility of miſtaking enlargement of the liver with hydatids, for hydrothorax. See in SANDIFORT (*Obſer. Anat. Path.* Lib. III. Cap. V. p. 83. Not. e.) a curious caſe of abſceſs; and indeed inſtances of ſuch caſes are very numerous. It has been found, too, that ſuch is the ſympathy between the ſtomach and liver, that the dreſſings after the operation for abſceſs being too much ſtuffed into the wound, have occaſioned violent bilious vomiting, which was removed upon withdrawing them.

" In diſſection, there is frequent occaſion to remark the ſoftneſs of the liver when diſeaſed; and it is neceſſary to obſerve its colour when not diſeaſed, ſo as to be able to judge, in any other inſtance, how far its colour is natural. Often, in diſeaſe, it is of a lighter colour, or ſpotted and marbled, or its thin edges are found tinged with blood as if inflamed, or perhaps they are found livid, which may ſometimes be produced by the poſition of the body after death, and the gravitation of the blood, as happens in the lungs. At any rate, there is ſeldom active inflammation of the liver. It is often ſchirrous and enlarged, and then aſcites is frequently combined. Its ſchirrous ſtate, when far advanced, is palpable enough; it feels knobby and irregular on the ſurface, and, when cut, the tubercles are generally of a light brown colour; (ſee varieties of theſe in Baillie's Morbid Anatomy). The liver, the kidney, the ſpleen, and the uterus, that is, all the ſolid viſcera, ſeem peculiarly the ſeat of hydatids, but particularly the liver; and from the burſting of the parent ſacs, ſituated in theſe parts, the ſmaller veſicles get entangled with the membranous viſcera.

"The laſt circumſtance that ſeems worthy of notice in this part of the belly, is the obliquity of the diaphragm, and the manner in which the parts lie upon it. If there be a tumor formed in any of thoſe parts that are protruded by the action of the diaphragm, ſuppoſe an aneuriſm of any of the veſſels, however the ſurface of the belly may be moved, the pulſation of this tumor will be continual upon the hand; but if the tumor be ſituated upon any of the veſſels whoſe attachment to the ſpine hinders them from being diſplaced by the motion of the diaphragm, then the action of the diaphragm, and conſequent protruſion of the viſcera and integuments of the belly, will give the feeling as if its pulſation were ſubſiding while the tumor retires from the hand. This circumſtance, ſimple as it is, is the more apt to be overlooked, as a patient, when a phyſician feels his belly, does not breathe regularly, but ſtrains himſelf, and breathes at intervals."

The drawings from which Mr. Bell's engravings are taken, are highly creditable to the author's ingenuity, and furniſh the ſtudent with a fair example of the utility, we had almoſt ſaid the abſolute neceſſity, of the art of deſigning, for thoſe who wiſh to become good anatomiſts and operators.

Sect. II. *Of the* Method *of* Opening *a* Dead Body.

Surgeons are often called, as has been obſerved, in order to inveſtigate the cauſe and ſeat of diſeaſes and death, either by the relations of the deceaſed, or the magiſtrates to whom a report is to be made; therefore, at the time of performing this operation, minutes ſhould be taken of what is obſerved. The inſtruments, and all things neceſſary, ſhould be diſpoſed in order, as for any other operation; as knives, a razor, a great and ſmall ſaw, ſciſſars ſtraight and curved, elevators, needles threaded, ſponges, tow, ſaw-duſt or bran, baſons with water, towels, and receivers for the viſcera when they are to be taken out of their cavities. The body is to be laid upon a ſuitable table, advantageouſly placed for the light, having a cloth thrown over the parts which decency demands should be concealed, eſpecially in females.

When it is intended only to inſpect *the abdomen* and its contents, a longitudinal inciſion from the xiphoid cartilage to the os pubis, interſected by a tranſverſe one at the navel, will give a fair opportunity of anſwering theſe purpoſes, when the angles are reverſed. Should it be required to examine all the three cavities, and the parts contained in them, we are to begin by opening *the head*, making an inciſion quite acroſs to the bone, from ear to ear; which ſection is preferable to the crucial, commonly made on this occaſion: then the ſcalp may be eaſily diſſected from the ſkull, and turned down over the face, and towards the neck, giving room for the ſaw. The head muſt be held very ſteadily by an aſſiſtant during the ſawing, which ſhould be begun on the middle of the frontal, proceeding to each temporal bone, and ſo to finiſh the circle upon the middle of the occipital bone; which may generally be done conveniently enough by raiſing the head and inclining it forward after having proceeded as far as this bone; or the body may then be turned prone, ſhould that poſture be found more convenient to complete the circle. The cap of the ſkull is then to be raiſed with the elevator, occaſionally cutting the adheſions of the dura mater; after this the encephalon is to be removed, carefully ſeparating the other attachments of the membrane.

In order to bring the *thorax and abdomen*, with the parts contained in theſe cavities, under one view, an inciſion is to be made on each ſide of the ſternum, in the courſe of the cartilages of the ribs which are annexed to it; diſſecting from thence the muſcles with the teguments, the ſpace of two or three inches towards the ſpine; then cutting through the cartilages, which will be ſeen, and eaſily divided with a knife a little curved near the point; then the inciſions are to be continued from the ſternum through the abdominal cavity, in an oblique direction, to each ilium or inguen; after which the clavicles are to be ſeparated from the ſternum, or this bone divided at the ſuperior cartilaginous junction, with a ſtrong knife, diſſecting it from the mediaſtinum, and turning it downwards with the muſcles, &c. of the abdomen. This is the moſt eligible manner of opening theſe cavities, and gives an opportunity of ſewing them up with a better appearance for any perſon's view afterwards. That kind of ſtitch called by ſempſtreſſes the *herring-bone*, or *flat-ſeam*, has a very pretty and neat effect upon theſe occaſions.

If it is purpoſed to take out the thoracic and abdominal viſcera together, for further examination, the diaphragm is firſt to be cut down to the ſpine on both ſides; then, to avoid being incommoded with blood, &c. two very ſtrong ligatures are to be paſſed round the œſophagus and large blood-veſſels, in which the trachea may be included; tying them ſtrait, and then dividing theſe parts between the ligatures: the ſame meaſures are to be taken in reſpect to the inferior veſſels upon the lumbar region, a little above the bifurcation of the aorta, including the vena cava; and alſo upon the rectum. After having obſerved theſe precautions, the viſcera, with the diaphragm, are to be removed by a cautious diſſection, all the way cloſe to the ſpine; and by gently drawing them at the ſame time, the ſeparation will be greatly facilitated.

When the thoracic and abdominal viſcera are to be taken out ſeparately, in the firſt caſe ligatures muſt be made, as have been deſcribed upon the veſſels, &c. juſt above the diaphragm, and in the other juſt below it, and upon the rectum.

Should we be called upon to perform this office *when the body is become very putrid*, it will be abſolutely neceſſary to have ſuch parts of it well waſhed with warm vinegar and brandy, and then ſprinkled with camphorated ſpirit or ſome ſuch odoriferous antiputreſcent liquor, before the examination, in order to correct the ſtench, and defend us againſt the noxious quality of the effluvia; a precaution, the neglect of which may be attended with very direful effects.

CHAP. XLI. OF THE METHOD OF MAKING ANATOMICAL PREPARATIONS.

THERE are two modes of preſerving anatomical ſubjects from putrefaction and the injuries of time, ſo as to exhibit the different parts of the human body either in their natural or diſeaſed ſtate. Theſe are either preſerved in a *dry*, or a *wet* ſtate, i. e. immerſed in ardent ſpirits.

Mr. Charles Bell, in his "*Syſtem of Diſſections*," gives the following uſeful directions on the mode of making anatomical preparations by injection:

"To thoſe," ſays Mr. Bell, "who are commencing their operations, ſmall ſubjects will be found the moſt convenient, being more eaſily managed, and not likely to embarraſs the ſtudent with much confuſion. Beſides, his views at firſt ſhould not be ſo immediately directed to practice; his object ſhould rather be to acquire general ideas of the anatomy. Young ſubjects are likewiſe much fitter for injection (I mean for the injection of the arteries, and for minute injection): they are not only more eaſily heated and managed, but, what is of more conſequence, their blood-veſſels have an elaſticity and ſtrength which enables them to bear the puſh of the injection better, and, by a kind of elaſtic reſiſtance, to give warning of the danger of rupturing their coats; while, in old bodies, the piſton of the ſyringe goes eaſily down ſo far, ſtops, and, if forced, moſt probably burſts the veſſels, driving the injection amongſt the muſcles, and giving much trouble in the diſſection. When any of the trunks burſt in this way, the tenſion being taken off, their coats contract upon the warm injection, and they remain half filled.

"In old age, this want of pliancy becomes very remarkable. There is often a kind of ſtiffneſs and rigidity, as if the coats of the veſſels were corrugated; a degree of that ſtate in which we find the arteries when oſſified, or when concretions are formed in their coats.

"If only ſome coarſe injection is, in a ſlovenly manner, to be thrown into the great veſſels to ſhew their courſe, it does not much ſignify how it is done, or what injection is uſed, or what means are employed to facilitate the paſſage of the injection. But if the veſſels are to be injected minutely, it is neceſſary previouſly to heat the ſubject well, by bathing it in warm water, or applying ſteam to the ſurface. This is of more conſequence than even the choice of the ſubject; for, as the injection is intended to be penetrating and fluid when warm, and, upon becoming cold, to congeal and remain ſolid in the veſſels, it is neceſſary that the veſſels be heated, that they may not ſuddenly chill the injection: beſides, this heating of the body ſoftens and relaxes all the maſs of fleſh, and brings it to a more ſuitable ſtate for admitting injection. But it ought to be remembered, that, if the parts be overheated, eſpecially where the veſſels to be injected lie expoſed, there is danger of ſpoiling all, by corrugating their coats, and making them quite friable and tender. There is a better way ſtill of heating the ſubject; viz. by heating the veſſels themſelves; and, indeed, the two methods ſhould be always combined.—The common practice in the injection of the great veſſels, is, to inject firſt equal parts of brown and white ſpirit varniſh, coloured with the ſame paint that is uſed for the coarſe or wax injection; and this fine varniſh injection, being moderately heated, and thrown in before the wax injection, clears its way, and moderately heats the veſſels, ſo that they do not readily cool or retard the wax injection which is to follow. But when uſing minute injection (which is ſize coloured with vermilion), for the purpoſe of demonſtrating the minute veſſels, although the hard injection is thrown into the veſſels after it, ſimply to ſtop the regurgitation of the warm and liquid ſize, and to retain it in the minuteſt extremities of the veſſels, yet it infallibly happens that the wax injection runs more minutely in this way than in any other. This being the caſe, it will be found, in all caſes, to be a better method to uſe painters' ſize, coloured with vermilion, and heated, but not ſo much as to criſp the veſſels; and to throw it in before the coarſe injection. It is the leaſt expenſive, runs more minutely, gives always a chance for beautiful ſpecimens of minute injection, and can be puſhed to any quantity, even till the ſkin of the limb becomes quite tenſe, without rupturing the veſſels, or thoſe veſſels at leaſt by which the coarſe injection can eſcape. By this means, the veſſels are dilated, the limb made warm and moiſt, and the wax injection flows eaſily into the arteries, whilſt the ſize eſcapes with the ſlighteſt preſſure into the cellular texture.

" There are ſtill other things which require attention; viz. the tying of all collateral veſſels that may have been opened, and the fixing of the tube ſecurely in the mouth of the veſſel. When the injecting pipe is introduced into the veſſel, it cannot be retained there by a ſimple knot, without a chance of its ſlipping off during the injection, or, if tied firmly, of cutting the coats of the veſſel. Therefore, after the ligature is drawn upon the artery including the tube, the ends of the ligature ſhould be brought over the wings of the tube, and then carried round ſo as to include that part of the ligature which reaches from the mouth of the tube to the wing; and being tied there, the former knot is tightened, and the mouth of the artery drawn up upon the barrel of the tube.

" The coarſe injection is compoſed of the following ingredients: Bees wax, ſix ounces; reſin, eight ounces; turpentine varniſh, ſix ounces. The wax and reſin give hardneſs and conſiſtency; and the varniſh is added to give it pliancy. Theſe colours are generally uſed: Vermilion, king's yellow, flake white, ſmalt, verditer, verdigreaſe, lamp black. They ſhould be mixed with the turpentine varniſh, and then added to the wax when melted; and ſhould there be occaſion to melt the injection a ſecond time, the heat muſt be cautiouſly applied, leſt the colours ſhould be burnt and deſtroyed. The injection ſhould not be thrown into the veſſels while too warm, for it will hurt their coats. The degree of heat ſhould be ſuch, that the finger can be allowed to remain in it for a little while.—A coarſer compoſition can be made with tallow, wax, ſpirit of turpentine, and oil, coloured with the coarſer paints; or, ſimply, tallow and red lead, when the parts are not to be preſerved. And for minute injection, turpentine, coloured with vermilion (which Haller preferred to all other injections, for running minutely, and without extravaſation); painters' ſize, coloured with any of the above paints; or equal parts of brown and white ſpirit varniſh.

" When delicate membranes are to be injected either with quickſilver or with fine ſize, inſtead of tying all the veſſels by which the fluid may eſcape, I have found it neceſſary only to ſear the edges of the membrane with a heated iron; or, after having fixed the tubes, the common method is to dry the edges all round, while the middle part is kept ſoft and moiſt. When it is required to demonſtrate the vaſcularity of a part where there is no opportunity of injecting it, if membranous, the blood may be detained in the veſſels by quickly drying and varniſhing it. The blood, when extravaſated, or when (as in the piles) preternaturally collected in veſſels, may be coagulated by a ſolution of alum; or blood in inflamed parts may be coagulated by diſtilled vinegar. In other inſtances, or in preparations of the lacteals, their natural fluids may be coagulated and preſerved by plunging them ſuddenly into ſtrong ſpirits.

"There are many parts of the body which it is impoſſible to keep for any time in their original beauty, and theſe the moſt delicate and intereſting; as the organs of the ſenſes, and all minute nervous parts, the villi of the inteſtines, the comparative anatomy of inſects, the incubated egg, &c. The ready demonſtration of ſuch delicate parts in the freſh ſubject is the trueſt teſt of the abilities of the practical anatomiſt; for there is more delicacy and nicety required in expoſing theſe parts, and more real benefit to be derived from them, than in making the more laſting preparations.—The minute ſtructure of many of theſe parts muſt be diſſected and unravelled under water, where the looſe and floating membranes diſplay themſelves; while, out of the water, they would lie collapſed and undiſtinguiſhed. In ſuch inveſtigations, I have found nothing of ſo much ſervice as jelly made ſtrong and quite tranſparent. When a delicate part is completely diſſected (ſuppoſe it to be the coats of the eye), place it in the jelly as it is becoming firm, and hold out the parts; and they will be retained, elegantly diſplayed, either for demonſtration or for drawing."

Some other obſervations on this ſubject, well worth the attention of ſtudents, may be found in Mr. Bell's publication, chap. 42.

Citizen Chauſſier communicated to the Society of Medicine at Paris, a new method of preſerving animal ſubſtances. After having enumerated the different methods employed for that purpoſe, he points out their defects and inſufficiency. For preparing parchment, the ſkins are macerated in water, diſengaging from them the unctuous particles, and diſſolving likewiſe a part of the mucilage, ſo that nothing remains but the fibrous part. For tanning, the hides are put into lime-water, ſulphuric acid, or into a ſolution of alkali, and afterwards expoſed to the action of the *tannin* or tanning principle. For preſerving anatomical preparations, they are generally put into alkohol, which dries them up, and entirely changes their proper form; and though they are in this way preſerved from putrefaction, yet they do not remain untouched by the inſects. The carbonat of ſoda, and the ſulphat of iron, which are alſo uſed for keeping off putrefaction from animal ſubſtances, render them ſoluble in water by combining themſelves with the unctuous particles, and forming a ſoap with them, whereby the ſize and form of the preparations are conſiderably altered. In order to avoid all theſe inconveniences, Cit. Chauſſier ſuffers the part intended for preſervation to be macerated during a longer or ſhorter time, from three to eight or ten days, according to their reſpective ſize, in a ſolution of oxygenated muriat of mercury in diſtilled water. This liquor being always kept in a perfect ſtate of ſaturation, by adding from time to time freſh muriat of mercury for that which is decompoſed, imparts a great ſolidity to the parts impregnated with it, by giving conſiſtency to the gelatinous parts, without changing their ſize and form; and when expoſed to the air for ſome time, they are ſecure from corruption and inſects. It is through the medium of this mode of preparation, that Cit. Chauſſier has made ſeveral intereſting obſervations on the ſtructure of the brain, and particularly of the ſpinal marrow; for he diſcovered that this part, after being deprived of its pia mater, is compoſed of ſix very diſtinct bundles; further, that all the nerves which ariſe from this part of the brain are by no means ſimple productions of its fibres, but that they are inſerted in it like hairs, by means of bulbs which adhere to the medulla by ſeveral ſmall roots; and when theſe nerves are pulled out, a double row of ſmall regular holes will appear to the eye, into which the bulbs are implanted. A portion of brain, preſented to the Society by the inventor of this method, had the ſolidity of wood, without the leaſt change in its natural ſize and form; another brain and ſpinal marrow prepared in the ſame way, very diſtinctly ſhewed the holes into which the nerves were ingrafted. The celebrated Ruyſch made alſo uſe of a liquor and of injections to preſerve his excellent anatomical preparations, by means of which he had ſucceeded in preſerving the body of his own daughter, in the colour of life and freſhneſs of youth. This liquor, which he always kept as a myſtery, ſeems to be the ſame with that of Cit. Chauſſier, or at leaſt ſomething analogous. According to Ruyſch, it likewiſe made the gelatin ſolid, and by degrees as hard as wood; the albuminous matter coagulated by it, and the cryſtalline lens put into it, became opake and white; the brain obtained in it a caſeous and ſolid conſiſtency. For colouring the injections, it is adviſable to take madder or cinnabar, but never to make them of wax, or any other unctuous matter, but of a mucilaginous ſolution, as the ſolution of ichthyocolla, or iſinglaſs. After having injected the parts, they ought to be put into the above ſolution of oxygenated muriat of mercury, where the matter for injecting concretes, and becomes ſolid. For preſerving whole bodies, it is neceſſary to make openings into the great cavities, head, cheſt, and belly, large enough for the liquor to penetrate into them, as without this precaution the inteſtines will not be ſecured from corruption. Ruyſch himſelf always made ſuch inciſions for the above purpoſe.

CHAP. XLII. OF EMBALMING DEAD BODIES.

In the early ages of the world, the practice of embalming dead bodies was very common, particularly among the Egyptians; but it has long been diſuſed in almoſt all countries, except for great perſonages. The following directions are taken from Mr. Gooch, to whom they were communicated by a perſon of great character, and well acquainted with the modern practice of embalming in this kingdom.

After eviſceration, as has been directed in opening a dead body, and continuing the inciſion further upwards, even into the mouth, and, if practicable, without cutting the ſkin of the neck, all the cavities are to be well cleanſed, and the humidity ſucked up with ſponges, then waſhed with *tinct. myrrhæ*, and filled with a ſpecies compounded of fragrant herbs, aromatic drugs, and gums reduced to powder not very fine, firſt reſtoring the heart to its former reſidence, after having opened its ventricles, cleanſed and waſhed them with the tincture, ſtuffed them with the ſpices, and ſewed them up; and then the cavities are to be ſtitched very cloſe with the glovers' or ſpiral ſuture. Large and deep inciſions are alſo to be made in all the moſt fleſhy parts, cleanſing and waſhing them with the tincture in the ſame manner, filling them with the antiſeptic ſpices, and ſtitching them up. Then the head, trunk, and limbs, are to be perfectly well covered with cerecloth; putting a piece under the chin, to be ſecured by ſewing on the top of the head, after having well adjuſted the cap of the ſkull, ſewed the ſcalp together, and cleaned the mouth, as has been directed for the other parts, and putting in ſome of the ſpices. The cerecloth is to be prepared, according to art, with a compoſition made of wax, roſin, ſtorax, and painters' drying oil. After the application of the cerecloth, with great care and exactneſs, cut into ſuitable pieces according to the reſpective parts, and cloſing them well every-where, the face, being cloſe ſhaved, is to be covered with ſome of the above compoſition melted, and laid on with a bruſh, of a proper degree of heat, and of a moderate thickneſs; which may have a faint fleſh-colour given it with vermilion; and when it is grown cold and ſtiff upon this part, it may be lightly covered with hard varniſh; or this varniſh, applied thick, may here ſerve the purpoſe alone. A cap is to be well adapted to the head, falling down upon the neck, and to be ſewed under the chin, making a few circular turns about the neck with a roller of a proper breadth. All the reſt of the corpſe is to be incloſed in a ſheet, to be artfully cut, and ſewed on very cloſe and ſmooth, with the fineſt tape, and the *flat ſeam* mentioned in a preceding chapter; over which an appropriate dreſs is to be put, as the relations or friends think fit to direct and appoint, and then laid into the coffin, which ſhould be in readineſs: but when it is ſome great perſonage, who is to lie in ſtate for public view before the funeral rites are ſolemnized, the dreſs muſt be appropriated to his dignity and character. The brain and other viſcera are to be put with ſome of the ſpices into a leaden box. Sometimes the heart, prepared as has been directed, to preſerve it from putrefaction, is depoſited in an urn by itſelf.

The late Dr. WILLIAM HUNTER recommended, in his lectures, the injecting into the blood-veſſels as much oil of turpentine, in which camphor and other antiſeptic gums were diſſolved, as they could be made to receive; and this certainly is a great improvement on the method of embalming above laid down.

APPENDIX.

Of SUSPENDED ANIMATION.

THE important art of RESUSCITATION, which, in ſo many caſes, the Surgeon is called on to exerciſe, is now become an indiſpenſable part of medical education. We ſhall, therefore, preſent to the reader's view all that the moſt enlightened and ingenious writers have offered, both theoretical and practical, on a ſubject far from being completely underſtood, but in which, no doubt, conſiderable advances have been made.

§ 1. CAUSES *of the* EXTINCTION *of* LIFE *in* DROWNING.

In ſome reſpects there ſeems to be a great ſimilarity between the death occaſioned by immerſion in water, called DROWNING, and that by ſtrangulation, ſuffocation by fixed air, apoplexies, epilepſies, ſudden faintings, violent ſhocks of electricity, or even violent falls and bruiſes. Medical men, however, are not agreed with regard to the nature of the injury done to the animal ſyſtem in any or all of theſe accidents. It is indeed certain, that in all the caſes above mentioned, particularly in drowning, there is very often ſuch a ſuſpenſion of the vital powers as, to us, hath the appearance of a total extinction of them; while yet they may be again ſet in motion, and the perſon reſtored to life, after a much longer ſubmerſion than has been generally thought capable of producing abſolute death.

De Haen, in his treatiſe on this ſubject, aſcribes the diverſity of opinion among phyſicians to their having been ſo ready to draw general concluſions from a few experiments. Some, having never found water in the lungs, have thought that it never was there; and others, from its preſence, have drawn a contrary concluſion. Some have aſcribed the death which happens in caſes of drowning to that ſpecies of apoplexy which ariſes from a great fulneſs of the ſtomach. But this opinion our author rejects; becauſe, in thirteen dogs which he had drowned, and afterwards diſſected, no ſigns of ſuch a fulneſs appeared. Another reaſon is drawn from the want of the common marks of apoplexy on the diſſection of the brain, and from the actual preſence of water in the lungs. He is of opinion, that the death of a drowned perſon happens in conſequence of water getting into the lungs, and ſtopping the blood in the arteries, and, of courſe, that blowing into the lungs muſt be hurtful, as it will increaſe the preſſure on the blood-veſſels.

Dr. Cullen, in his letter on this ſubject to Lord Cathcart, ſays, that very often the water does not enter the lungs, nor even the ſtomach, in any material quantity; and that, in moſt caſes, no hurt is done to the organization of the vital parts. Hence he argues, that the death which ſeems to enſue is owing to the ſtoppage of reſpiration, and the conſequent ceaſing of the circulation of the blood, whereby the body loſes its heat and vital principle.

In the Philoſophical Tranſactions, vol. lxvi. Mr. Hunter advances the following theory:—The loſs of motion in drowning ſeems to ariſe from the loſs of reſpiration; and the immediate effect this has upon the other vital motions of the animal, at leaſt this privation of breathing, appears to be the firſt cauſe of the heart's motion ceaſing. It is moſt probable, therefore, Mr. Hunter obſerves, that the reſtoration of breathing is all that is neceſſary to reſtore the heart's motion; for if a ſufficiency of life ſtill remains to produce that effect, we may ſuppoſe every part equally ready to move the very inſtant in which the action of the heart takes place, their actions depending ſo much upon it. What makes it very probable that the principal effect depends upon throwing air into the lungs is, that children in the birth, when too much time has been ſpent after the loſs of that life which is peculiar to the fœtus, loſe altogether the diſpoſition for the new life. In ſuch caſes there is a total ſuſpenſion of the actions of life; the child remains to all appearance dead; and would die if air was not thrown into its lungs, and the firſt principle of action by that means reſtored. To put this in a clearer light, Mr. Hunter gives the reſult of ſome experiments made on a dog in 1755.—A pair of double bellows were provided, which were ſo conſtructed, that by one action air was thrown into the lungs, and by the other the air was ſucked out which had been thrown in by the former, without mixing them together. The muzzle of theſe bellows was fixed into the trachea of a dog, and by working them he was kept perfectly alive. While this artificial breathing was going on, the ſternum was taken off, ſo that the heart and lungs were expoſed to view. The heart then continued to act as before, only the frequency of its action was greatly increaſed. Mr. Hunter then ſtopped the motion of the bellows; and obſerved that the contraction of the heart became gradually weaker and leſs frequent, till it left off moving altogether: but by renewing the operation, the motion of the heart alſo revived, and ſoon became as ſtrong and frequent as before. This proceſs was repeated upon the ſame dog ten times; ſometimes ſtopping for five, eight, or ten minutes. Mr. Hunter obſerved, that every time he left off working the bellows, the heart became extremely turgid with blood, and the blood in the left ſide became as dark as that in the right, which was not the caſe when the bellows were working. Theſe ſituations of the animal, he obſerves, ſeem to be exactly ſimilar to drowning.

Dr. Goodwyn, in a ſubſequent treatiſe on this ſubject, has endeavoured to aſcertain the effects of ſubmerſion upon living animals in a ſtill more accurate manner; and this inveſtigation is accompanied with a moſt careful and ingenious enquiry concerning the cauſes of the different phenomena which he remarked in the courſe of a great number of experiments.

His firſt care was to determine the ſymptoms which took place before death; and, to obſerve theſe, he procured a large glaſs bell in which the animals were to be immerſed. Having inverted, and filled this with water, he put into it ſeveral cats, dogs, rabbits, and ſmaller animals, confining them among the water till they were apparently dead. In theſe experiments he obſerved, that immediately after ſubmerſion the pulſe became weak and frequent; there was an apparent anxiety about the breaſt, and ſtruggling to relieve it. In theſe ſtruggles the animal roſe to the top of the water, throwing out a quantity of air from the lungs. After this the anxiety increaſes, the pulſe becomes weaker, and the ſtruggles more violent; he riſes again to the ſurface, throws out more air from the lungs, and in his efforts to inſpire, a quantity of water commonly paſſes into the mouth. The ſkin about the face and lips then becomes blue, the pulſe ceaſes, the ſphincters are relaxed, and the animal falls down without ſenſe or motion. On diſſecting the bodies of drowned animals, our author met with the following appearances: 1. The external ſurface of the brain was darker, but the veſſels of it were not more turgid than uſual, nor was there any appearance of extravaſation. 2. The pulmonary arteries and veins were filled with black blood, and the lungs themſelves contained ſome frothy liquid. 3. Notwithſtanding theſe ſymptoms, the right auricle and ventricle were ſtill contracting and dilating; the left ſinus venoſus and auricle moving feebly, but the left ventricle at reſt. 4. The right and left auricles of the heart, the right ventricle, and the left ſinus venoſus, were filled with black blood; but the laſt ventricle only half filled with the ſame, and a quantity of the ſame black blood was alſo contained in the ſmaller branches of the arteries proceeding from the left ventricle.

This inveſtigation was followed by a moſt careful and ingenious enquiry concerning the cauſes of the ſymptoms already related. To find out whether or not the entrance of water into the lungs was the cauſe, or whether water really entered into the lungs in theſe caſes or not, he drowned ſeveral animals among ink; and by inſpecting their bodies, found, that though water really did enter, it was in ſuch ſmall quantity that it could not be ſuppoſed capable of producing ſuch violent effects. To aſcertain this, however, more exactly than could be done by the ink, he drowned other animals in quickſilver; which, by reaſon of its not being miſcible with the animal fluids, could be more accurately collected. By theſe it appeared that no more than five drachms of the fluid in which a cat was immerſed entered her lungs in the time of drowning; and to determine whether or not this could be the occaſion of the animal's death, he made the following experiment:—Having confined a cat in an erect poſture, he made a ſmall opening in the trachea, by cutting one of the cartilaginous rings; and through this opening he introduced two ounces of water into the lungs. The only conſequences were a difficulty of breathing and weak pulſe; but theſe ſoon abated, and it lived ſeveral hours afterwards without any apparent inconvenience. On ſtrangling it he found two ounces and a half of water in the lungs. On repeating the experiments with other fluids, he found the difficulty of breathing and alteration in the pulſe ſomewhat greater: but in theſe inſtances alſo they abated in a few hours; and when the animals were ſtrangled, the lungs were found to contain four ounces of fluid.

From a review of theſe experiments, Dr. Goodwyn draws the following concluſions: "1. A ſmall quantity of fluid uſually paſſes into the lungs in drowning. 2. This water enters the lungs during the efforts to inſpire; and mixing with the pulmonary mucus, occaſions the frothy appearance mentioned by authors. 3. The whole of this fluid in the lungs is not ſufficient to produce the changes that take place in drowning. And hence it follows, that the water produces all the changes that take place in drowning *indirectly*, by excluding the atmoſpheric air from the lungs." This naturally leads to an inveſtigation of the uſes of reſpiration, and the effects of the air upon the blood and lungs in that action, which our author traces with great accuracy and very convincing experiments. He begins with attempting to determine the quantity of air drawn in at each inſpiration, with the proportional quantity left after expiration. The experiments by which he endeavoured to aſcertain theſe quantities ſeem to be more uncertain than the others, as, indeed, there are not data ſufficient for them. Concerning the chemical changes produced in the air by reſpiration, and the effects of the air upon the blood itſelf, we ſhall only obſerve in general, that his experiments evidently ſhew, that the diſeaſe produced by drowning ariſes entirely from the excluſion of the atmoſpheric air, or its dephlogiſticated part; for which reaſon he recommends inflating the lungs with that kind of air in preference to any other.

From theſe different views of the matter, phyſicians have differed conſiderably in their account of the methods to be followed in attempting the recovery of drowned perſons. De Haen recommends agitation of all kinds; every kind of ſtimulus applied to the mouth, noſe, and rectum; bleeding; heat, both by warm cloths and warm water; blowing air into the trachea; ſtimulants, ſuch as bliſters, warm aſhes, &c. applied to the head, ancles, thighs, pit of the ſtomach, and other parts. Of theſe we ſhall now ſpeak.

§ 2. *Of the* MEANS *to be* USED *for the* RECOVERY *of* DROWNED PERSONS.

The following are Dr. Cullen's obſervations on this ſubject:— "With reſpect," ſays he, "to the particular means to be employed for the recovery of drowned perſons, it is to be obſerved, in the firſt place, that ſuch as were recommended and practiſed, upon a ſuppoſition that the ſuffocation was occaſioned by the quantity of water taken into the body, and therefore to be evacuated again, were very unhappily adviſed. The hanging up of perſons by the heels, or ſetting them upon the crown of the head, or rolling the body upon a caſk, were generally practiſed, upon a ſuppoſition altogether falſe; or upon the ſuppoſition of a caſe which, if real, is apprehended to be irrecoverable. At the ſame time, theſe practices were always attended with the danger of burſting ſome veſſels in the brain or lungs, and of rendering thereby ſome caſes incurable, that were not ſo from the drowning alone. All ſuch practices, therefore, are now very properly diſapproved of and forbid.

"In thoſe caſes in which the body has not been long in the water, and in which therefore the natural heat is not entirely extinguiſhed, nor the irritability of the moving fibres very greatly impaired, it is poſſible that a good deal of agitation of the body may be the only means neceſſary to reſtore the action of the vital organs; but in other caſes, where the heat and irritability have ceaſed to a greater degree, it is to me very doubtful if much agitation can be ſafe, and if any degree of it can be uſeful, till the heat and irritability are in ſome meaſure reſtored. In all caſes, any violent concuſſion cannot be ſafe, and, I believe, is never neceſſary. It may be proper here to obſerve alſo, that, in tranſporting the body from the place where it is taken out of the water, to the place where it may be neceſſary for applying the proper means of its recovery, all poſtures expoſing to any improper compreſſion, as that of the body's being carried over a man's ſhoulder, are to be avoided. The body is to be kept ſtretched out, with the head and upper parts a little raiſed; and care is to be taken to avoid the neck's being bent much forward. In this manner, laid upon one ſide, and upon ſome ſtraw in a cart, it may be moſt properly conveyed; and the agitation which a pretty briſk motion of the cart may occaſion, will, in moſt caſes, do no harm.

"From the account I have given above of the cauſes, or of the appearances, of death, in drowned perſons, it is evident, that the firſt ſtep to be taken for their recovery is to reſtore the heat of the body, which is abſolutely neceſſary to the activity of the moving fibres. For this purpoſe, the body, as ſoon as poſſible, is to be ſtripped of its wet clothes, to be well dried, and to be wrapped up in dry, and (if poſſible) warm coverings: and it is to be wiſhed, in all caſes, as ſoon as the report of a perſon's being drowned is heard, that blankets ſhould be immediately carried to the water-ſide, ſo that, as ſoon as the body is got out of the water, the change of covering juſt now mentioned may be inſtantly made; or, if the body has been naked when drowned, that it may be immediately dried, and defended againſt the cold of the air. Beſides covering the body with blankets, it will be further of advantage, if it can be done without loſs of time, to cover the drowned body with a warm ſhirt or waiſtcoat immediately taken from a living perſon.

"When, at the time of a perſon's being drowned, it happens that the ſun ſhines out very hot, I think there can be no better means of recovering the heat, than by expoſing the naked body, in every part, to the heat of the ſun; while, at the ſame time, all other means neceſſary or uſeful for the recovery of life are alſo employed.

"When the heat of the ſun cannot be employed, the body ſhould be immediately tranſported to the neareſt houſe that can be got convenient for the purpoſe: the fitteſt will be one that has a tolerably large chamber, in which a fire is ready, or can be made; and, if poſſible, the houſe ſhould afford another chamber, in which alſo a fire can be provided.

"When the drowned body is brought into ſuch houſe, and care is at the ſame time taken that no more people are admitted than are abſolutely neceſſary to the ſervice of the drowned perſon, every endeavour muſt be immediately employed for recovering the heat of the body, and that by different meaſures, as circumſtances ſhall direct.

"If, in the neighbourhood of the place, there be any brewery, diſtillery, dyery, or fabric which gives an opportunity of immediately obtaining a quantity of warm water and a convenient veſſel, there is nothing more proper than immerſing the body in a warm bath. Even where a ſufficient quantity of warm water cannot be had at once, the bath may be ſtill practiſed, if the accident has happened in or very near a town or village, when a great many fires may be at once employed in heating ſmall quantities of water; for in this way the neceſſary quantity may be ſoon obtained. To encourage this practice, it is to be obſerved, that one part of boiling water is more than ſufficient to give the neceſſary heat to two parts of ſpring or ſea water, as it is not proper to apply the bath at firſt very warm, nor even of the ordinary heat of the human body, but ſomewhat under it; and, by the addition of warm water, to bring it gradually to a heat very little above it.

" If the drowned body be of no great bulk, it may be conveniently warmed by a perſon's lying down in bed with it, and taking it near to their naked body, changing the poſition of it frequently, and at the ſame time chaffing and rubbing with warm cloths the parts which are not immediately applied to their warm body.

" If none of theſe meaſures can be conveniently practiſed, the body is to be laid upon a bed before a moderate fire, and frequently turned, to expoſe the different parts of it; and thus, by the heat of the fire gradually applied, and by rubbing the body well with coarſe towels, or other cloths, well warmed, pains are to be taken for reſtoring its heat. This will be promoted by warm cloths applied and frequently renewed under the hams and arm-pits; and by hot bricks, or bottles of warm water, laid to the feet.

" In the practice of rubbing, it has been propoſed to moiſten the cloths applied with camphorated ſpirits, or other ſuch ſtimulating ſubſtances: but I think this muſt prove an impediment to the rubbing; and I would not recommend any practice of this kind, except, perhaps, the application of the vinous ſpirit of ſal ammoniac to the wriſts and ancles only.

" For recovering the heat of the body, it has been propoſed to cover it all over with warm grains, aſhes, ſand, or ſalt; and where theſe, ſufficiently warm, are ready at hand, they may be employed; but it is very ſeldom they can be obtained, and the application might often interfere with other meaſures that may be neceſſary. All therefore that I can propoſe, with reſpect to the uſe of theſe, is to obſerve, that bags of warm and dry ſalt may be amongſt the moſt convenient applications to the feet and hands of drowned perſons; and the quantity neceſſary for this purpoſe may be got pretty quickly by heating the ſalt in a frying-pan over a common fire.

" While theſe meaſures are taking for recovering the heat, means are at the ſame time to be employed for reſtoring the action of the moving fibres. It is well known, that the inteſtines are the parts of the body which, both from their internal ſituation and peculiar conſtitution, retain the longeſt their irritability; and therefore that, in drowned perſons, ſtimulants applied may have more effect upon the inteſtines than upon other parts. The action, therefore, of the inteſtines is to be ſupported or renewed as ſoon as poſſible; as the reſtoring and ſupporting the action of ſuch a conſiderable portion of moving fibres as thoſe of the inteſtines, muſt contribute greatly to reſtore the activity of the whole ſyſtem.

" For exciting the action of the inteſtines, the moſt proper mean is, the application of their ordinary ſtimulus of dilatation; and this is moſt effectually applied by forcing a quantity of air into them by the fundament. Even the throwing in cold air has been found uſeful: but it will certainly be better if heated air can be employed; and further if that air can be impregnated with ſomething which, by its acrimony, alſo may be powerful in ſtimulating the inteſtines.

" From all theſe conſiderations, the ſmoke of burning tobacco has been moſt commonly applied, and has upon many occaſions proved very effectual. This will be moſt properly thrown in by a particular apparatus, which, for other purpoſes as well as this, ſhould be in the hands of every ſurgeon; or at leaſt ſhould, at the public expence, be at hand in every part of the country where drownings are likely to happen. With regard to the uſe of it, I have to obſerve, that till the tobacco is kindled in a conſiderable quantity, a great deal of cold air is blown through the box and tube; and as that, as hinted above, is not ſo proper, care ſhould be taken to have the tobacco very well kindled, and to blow through it very gently, till the heated ſmoke only paſſes through. If, upon certain occaſions, the apparatus referred to ſhould not be at hand, the meaſure however may be executed by a common tobacco-pipe, in the following manner: a common clyſter-pipe, that has a bag mounted upon it, is to be introduced into the fundament, and the mouth of the bag is to be applied round the ſmall end of a tobacco-pipe. In the bowl of this, tobacco is to be kindled; and, either by a playing card made into a tube, and applied round the mouth of the bowl, or by applying upon this the bowl of another pipe that is empty, and blowing through it, the ſmoke may be thus forced into the inteſtines, and, in a little time, in a conſiderable quantity.

" If none of theſe means for throwing in the ſmoke can be employed, it may be uſeful to inject warm water to the quantity of three or four Engliſh pints. This may be done by a common clyſter-bag and pipe, but better by a large ſyringe; and it may be uſeful to diſſolve in the water ſome common ſalt, in the proportion of half an ounce to an Engliſh pint, and alſo to add to it ſome wine or brandy.

" While theſe meaſures for recovering the heat of the body and the activity of the moving fibres are employed, and eſpecially after they have been employed for ſome time, pains are to be taken to complete and finiſh the buſineſs, by reſtoring the action of the lungs and heart.

" On this ſubject, I am obliged to my learned and ingenious colleague, Dr. Monro, who has made ſome experiments for aſcertaining the beſt manner of inflating the lungs of drowned perſons. By theſe experiments he finds it may be more conveniently done by blowing into one of the noſtrils, than by blowing into the mouth. For blowing into the noſtril, it is neceſſary to be provided with a wooden pipe, fitted at one extremity for filling the noſtril, and at the other for being blown into by a perſon's mouth, or for receiving the pipe of a pair of bellows, to be employed for the ſame purpoſe. Dr. Monro finds, that a perſon of ordinary ſtrength can blow into ſuch a pipe with a ſufficient force to inflate the lungs to a conſiderable degree; and thinks the warm air from the lungs of a living perſon will be moſt conveniently employed at firſt; but when it is not ſoon effectual in reſtoring the reſpiration of the drowned perſon, and that a longer continuance of the inflation is neceſſary, it may be proper to employ a pair of bellows, large enough at once to contain the quantity of air neceſſary to inflate the lungs to a due degree.

" Whether the blowing-in is done by a perſon's mouth or by bellows, Dr. Monro obſerves, that the air is ready to paſs by the gullet into the ſtomach; but that this may be prevented, by preſſing the lower part of the larynx backwards upon the gullet. To perſons of a little knowledge in anatomy, it is to be obſerved, that the preſſure ſhould be only upon the cricoid cartilage, by which the gullet may be ſtraitened, while the paſſage through the larynx is not interrupted.

" When, by blowing thus into the noſtril, it can be perceived, by the raiſing of the cheſt or belly, that the lungs are filled with air, the blowing in ſhould ceaſe; and, by preſſing the breaſt and belly, the air received into the lungs ſhould be again expelled; then the blowing and expulſion ſhould be again repeated; and thus the practice is to be continued, ſo as to imitate, as exactly as poſſible, the alternate motions of natural reſpiration.

" It is hardly neceſſary to obſerve, that when the blowing into the noſtril is practiſed, the other noſtril and the mouth ſhould be accurately cloſed.

" If it ſhould happen, that, in this practice, the air does not ſeem to paſs readily into the lungs, Dr. Monro informs me, it is very practicable to introduce directly into the glottis and trachea a crooked tube, ſuch as the catheter uſed for a male adult. For this he offers the following directions: the ſurgeon ſhould place himſelf on the right ſide of the patient; and, introducing the fore-finger of his left hand at the right corner of the patient's mouth, he ſhould puſh the point of it behind the epiglottis; and uſing this as a directory, he may enter the catheter, which he holds in his right hand, at the left corner of the patient's mouth, till the end of it is paſſed beyond the point of his fore-finger; and it is then to be let fall, rather than puſhed into the glottis; and through this tube, by a proper ſyringe applied to it, air may be with certainty blown into the lungs. I obſerve, that ſome ſuch meaſure had been propoſed by Monſ. Le Cat in France; but I have not learned that it has ever been put in practice, and I am afraid it may be attended with ſeveral difficulties, and muſt be left to the diſcretion of ſurgeons, who may be properly provided and inſtructed for this purpoſe.

" For throwing air with more certainty into the lungs, it has been propoſed to open the windpipe in the ſame manner as is done in the operation which the ſurgeons call *bronchotomy*, and by this opening to blow into the lungs; and when the blowing into the noſtril does not ſeem to ſucceed, and a ſkilful operator is at hand, I allow that the meaſure may be tried; but I can hardly ſuppoſe that it will be of any advantage when the blowing in by the noſtril has entirely failed.

" It is to be hoped, that by blowing into the lungs, one way or other, even a quantity of water which had been taken into the lungs may be again waſhed out; and the ſame ſeems to be the only effectual means of waſhing out that frothy matter which is found to fill the lungs of drowned perſons, and which proves, if I miſtake not, the moſt common cauſe of their mortal ſuffocation. This practice, therefore, is to be immediately entered upon, and very aſſiduouſly continued for an hour or two together.

" I have now mentioned the meaſures chiefly to be purſued and depended upon for the recovery of drowned perſons; but muſt ſtill mention ſome others that may prove conſiderable helps to it.

" One of theſe is, the opening the jugular veins to relieve the congeſtion, which almoſt conſtantly occurs in the veins of the head, and is probably a frequent cauſe of the death of drowned perſons. For relieving this congeſtion, the drawing ſome blood from the jugulars very early may certainly be of ſervice; and it will be particularly indicated by the livid and purple colour of the face. It may even be repeated, according to the effect it ſeems to have in taking off that ſuffuſion; but when the drowned perſon is in ſome meaſure recovered, and ſome motion of the blood is reſtored, it will be proper to be very cautious in making this evacuation, and at leaſt to take care not to puſh it ſo far as to weaken too much the recovering, but ſtill weak, powers of life.

" Another meaſure for recovering the activity of the vital principle is the application of certain ſtimulants to the more ſenſible parts of the body, ſuch as holding the quick-lime ſpirit of ſal ammoniac to the noſe, or putting a little of it upon a rag into the noſtrils. It has been uſual to pour ſome liquids into the mouth; but it is dangerous to pour in any quantity of liquid, till it appear that the power of ſwallowing is in ſome meaſure reſtored.

"When a ſurgeon is at hand, and is provided with proper apparatus, a crooked pipe may be introduced into the gullet; and by this a gill or two of warm wine may be poured down into the ſtomach, and probably with advantage. But when no ſuch apparatus is at hand, or ſurgeon to employ it, and the power of ſwallowing is ſtill doubtful, the trial of pouring liquids into the mouth ſhould be made by a ſmall quantity of warm water alone; and when, from ſuch trial, the power of ſwallowing ſhall appear to be recovered, it may then be allowable to favour the further recovery of the perſon, by pouring in ſome wine or brandy. In ſhort, till ſome marks of the recovery of ſwallowing and reſpiration appear, it will not be ſafe to apply any ſtimulants to the mouth, excepting that of a few drops of ſome acrid ſubſtance to the tongue, and which are not of bulk enough to ſlide back upon the glottis. I can think of no ſtimulant more conveniently and ſafely to be applied to the mouth and noſtrils, than a moderate quantity of tobacco-ſmoke blown into them.

"Though I do not imagine that drowned perſons are ever hurt by the quantity of water taken into their ſtomachs, yet, as a ſtimulus applied to the ſtomach, and particularly as the action of vomiting proves a ſtimulus to the whole ſyſtem, I can have no objection to the French practice of throwing in an emetic as ſoon as any ſwallowing is reſtored. For this purpoſe, I would ſucceſſively throw in ſome tea-ſpoonfuls of the ipecacuanha wine; and, when it does not interfere with other neceſſary meaſures, the fauces may be gently irritated by an oiled feather thruſt into them.

"With regard to the ſtimulants, I muſt conclude with obſerving, that when a body has lain but for a ſhort time in the water, and that therefore its heat and irritability are but little impaired, the application of ſtimulants alone has been often found effectual for the recovery; but, on the contrary, when the body has lain long in the water, and the heat of it is very much extinguiſhed, the application of any other ſtimulants than that of tobacco-ſmoke to the inteſtines can be of very little ſervice; and the application of others ought never to interfere with the meaſures for recovering heat and the motion of reſpiration.

"With reſpect to the whole of theſe practices, I expect, from the principles on which they are in general recommended, it will be underſtood, that they are not to be ſoon diſcontinued, though their effects do not immediately appear. It is obvious, that, in many caſes, it may be long before the heat of the body, and the activity of the vital principle, can be reſtored, although, in a longer time, it may very poſſibly be accompliſhed. In fact, it has often happened, that though means employed for one hour have not ſucceeded, the ſame continued for two or more hours have, at length, had the wiſhed-for effects. It ſhould therefore be a conſtant rule in this buſineſs, that the proper means ſhould be employed for ſeveral hours together; unleſs it happen, that, while no ſymptoms of returning life appear, the ſymptoms of death ſhall at the ſame time go on conſtantly increaſing.

"In the whole of the above I have kept in view chiefly the caſe of drowned perſons: but it will be obvious, that many of the meaſures propoſed will be equally proper and applicable in other caſes of ſuffocation; as thoſe from ſtrangling, the damps of mines, the fumes of charcoal, &c.; and a little attention to the difference of circumſtances will lead to the meaſures moſt proper to be employed."

Mr. Hunter, in the before-mentioned paper, differs pretty conſiderably from De Haen and Dr. Cullen. He obſerves, that when aſſiſtance is ſoon called in after immerſion, blowing air into the lungs will in ſome caſes effect a recovery; but when any conſiderable time has been loſt, he adviſes ſtimulant medicines, ſuch as the vapour of volatile alkali, to be mixed with the air; which may eaſily be done, by holding ſpirits of hartſhorn in a cup under the receiver of the bellows. And, as applications of this kind to the olfactory nerves tend greatly to rouſe the living principle, and put the muſcles of reſpiration into action, it may probably, therefore, be moſt proper to have air impregnated in that manner thrown in by the noſe. To prevent the ſtomach and inteſtines from being too much diſtended by the air ſo injected, the larynx is directed to be gently preſſed againſt the œſophagus and ſpine.

While this buſineſs is going on, an aſſiſtant ſhould prepare bed-clothes, carefully brought to a proper degree of heat. Heat our author conſiders as congenial with the living principle; increaſing the neceſſity of action, it increaſes action; cold, on the other hand, leſſens the neceſſity, and of courſe the action is diminiſhed; to a due degree of heat, therefore, the living principle, he thinks, owes its vigour. From experiment, he ſays, it appears to be a law in animal bodies, that the degree of heat ſhould bear a proportion to the quantity of life; as life is weakened, this proportion requires great accuracy, while greater powers of life allow it greater latitudes.

After theſe and ſeveral other obſervations on the ſame ſubject, our author proceeds to more particular directions for the management of drowned people.

If bed-clothes are put over the perſon, ſo as ſcarce to touch him, ſteams of volatile alkali, or of warm balſams, may be thrown in, ſo as to come in contact with many parts of the body. And it might probably be advantageous, Mr. Hunter obſerves, to have ſteams of the ſame kind conveyed into the ſtomach. This, we are told, may be done by a hollow bougie, and a ſyringe; but the operation ſhould be very ſpeedily performed, as the inſtrument, by continuing long in the mouth, might produce ſickneſs, which our author ſays he would always wiſh to avoid.

Some of the warm ſtimulating ſubſtances, ſuch as juice of horſe-radiſh, pepper-mint water, and ſpirits of hartſhorn, are directed to be thrown into the ſtomach in a fluid ſtate, as alſo to be injected by the anus. Motion poſſibly may be of ſervice; it may at leaſt be tried; but as it hath leſs effect than any other of the uſually preſcribed ſtimuli, it is directed to be the laſt part of the proceſs.

The ſame care in the operator, in regulating the proportion of every one of theſe means, is here directed, as was formerly given for the application of heat. For every one of them, our author obſerves, may poſſibly have the ſame property of deſtroying entirely the feeble action which they have excited, if adminiſtered in too great a quantity: inſtead, therefore, of increaſing and haſtening the operations on the firſt ſigns of returning life being obſerved, as is uſually done, he deſires they may be leſſened; and adviſes their increaſe to be afterwards proportioned, as nearly as poſſible, to the quantity of powers as they ariſe.

When the heart begins to move, the application of air to the lungs ſhould be leſſened, that, when the muſcles of reſpiration begin to act, a good deal may be left for them to do.

Mr. Hunter abſolutely forbids blood-letting in all ſuch caſes; for, as it not only weakens the animal principle, but leſſens life itſelf, it muſt conſequently, he obſerves, leſſen both the powers and diſpoſitions to action. For the ſame reaſon, he is againſt introducing any thing into the ſtomach that might produce ſickneſs or vomiting; and, on the ſame principle, he ſays, we ſhould avoid throwing tobacco fumes, or any other ſuch articles, up by the anus, as might tend to an evacuation that way.

We have thus far detailed the different theories of the moſt ingenious medical men of the age, on the ſubject of ſuſpended animation, and alſo the practices adapted to them; but with all due deference to thoſe truly great authorities, we think it expedient, nevertheleſs, to tranſcribe the conciſe and practical inſtructions, circulated by the Royal Humane Society, which are as follows:

1. As ſoon as the patient is taken out of the water, the wet clothes, if the perſon is not naked at the time of the accident, ſhould be taken off with all poſſible expedition on the ſpot (unleſs ſome convenient houſe be very near), and a great coat or two, or ſome blankets, if convenient, ſhould be wrapped round the body.

2. The patient is to be thus carefully conveyed, in the arms of three or four men, or on a bier, to the neareſt public, or other houſe, where a good fire, if in the winter ſeaſon, and a warm bed, can be made ready for its reception. As the body is conveying to this place, great attention is to be paid to the poſition of the

head; it muſt be kept ſupported in a natural and eaſy poſture, and not ſuffered to hang down.

3. In cold or moiſt weather, the patient is to be laid on a mattreſs or bed before the fire, but not too near; or in a moderately heated room: in warm and ſultry weather, on a bed only. The body is then to be wrapped, as expeditiouſly as poſſible, with a blanket, and thoroughly dried with warm coarſe cloths or flannels.

4. In ſummer, or ſultry weather, too much air cannot be admitted. For this reaſon, it will be neceſſary to ſet open the windows and doors, as cool refreſhing air is of the greateſt importance in the proceſs of reſuſcitation.

5. Not more than ſix perſons are to be preſent to apply the proper means; a greater number will be uſeleſs, and may retard, or totally prevent, the reſtoration of life, by rendering the air of the apartment unwholeſome. It will be neceſſary, therefore, to requeſt the abſence of thoſe who attend merely from motives of curioſity.

6. It will be proper for one of the aſſiſtants, with a pair of bellows of the common ſize, applying the pipe a little way up one noſtril to blow with ſome force, in order to introduce air into the lungs; at the ſame time, the other noſtril and the mouth are to be cloſed by another aſſiſtant, whilſt a third perſon gently preſſes the cheſt with his hands, after the lungs are obſerved to be inflated. By purſuing this proceſs, the noxious and ſtagnant vapours will be expelled, and natural breathing imitated. If the pipe of the bellows be too large, the air may be blown in at the mouth, the noſtrils at the ſame time being cloſed, ſo that it may not eſcape that way: but the lungs are more eaſily filled, and natural breathing better imitated, by blowing up the noſtril.

7. Let the body be gently rubbed with common ſalt, or with flannels ſprinkled with ſpirits, as rum or geneva. A warming-pan heated (the body being ſurrounded with flannel) may be lightly moved up and down the back. Fomentations of hot brandy are to be applied to the pit of the ſtomach, loins, &c. and often renewed. Bottles, filled with hot water, heated tiles, covered with flannel, or hot bricks, may be efficaciouſly applied to the ſoles of the feet, palms of the hands, and other parts of the body. The temples may be rubbed with ſpirits of hartſhorn, and the noſtrils now and then tickled with a feather; and ſnuff, or *eau de luce*, ſhould be occaſionally applied.

8. Tobacco fumes ſhould be thrown up the fundament; if a fumigator be not at hand, a common pipe may anſwer the purpoſe. The operation ſhould be frequently performed, as it is of importance; for the good effects of this proceſs have been experienced in a variety of inſtances of ſuſpended animation. But ſhould the application of tobacco-ſmoke in this way not be immediately convenient, or other impediments ariſe, clyſters of this

herb, or other acrid infuſions, with ſalt, &c. may be thrown up with advantage.

9. When theſe means have been employed a conſiderable time without ſucceſs, and any brewhouſe or warm bath can be readily obtained, the body ſhould be carefully conveyed to ſuch a place, and remain in the bath, or ſurrounded with warm grains, for three or four hours. If a child has been drowned, its body ſhould be wiped perfectly dry, and immediately placed in bed between two healthy perſons. The ſalutary effects of the natural vital warmth, conveyed in this manner, have been proved in a variety of ſucceſsful caſes.

10. While the various methods of treatment are employed, the body is to be well ſhaken every ten minutes, in order to render the proceſs of animation more certainly ſucceſsful; and children, in particular, are to be much agitated, by taking hold of their legs and arms frequently, and for a continuance of time. In various inſtances agitation has forwarded the recovery of boys who have been drowned, and continued for a conſiderable time apparently dead.

11. If there be any ſigns of returning life, ſuch as ſighing, gaſping, or convulſive motions, a ſpoonful of any warm liquid may be given; and if the act of ſwallowing can be performed, a cordial of warm brandy or wine may be given in ſmall quantities, and frequently repeated.

12. Electricity may be tried by the judicious and ſkilful, as its application neither prevents nor retards the various modes of recovery already recommended; but, on the other hand, will moſt probably tend to render the other means employed more certainly, and more expeditiouſly efficacious. This ſtimulus bids fair to prove an important auxiliary in caſes of apparent death; and therefore deſerves the ſerious regard and attention of the faculty.*

The methods which have been deſcribed, are to be employed with vigour for three hours or upwards, although no favourable circumſtances ſhould ariſe; for it is a vulgar and dangerous error to ſuppoſe that perſons are irrecoverable, becauſe life does not ſoon make its appearance; an opinion that has conſigned to the grave an immenſe number of the ſeemingly dead, who might have been reſtored to life by reſolution and perſeverance. *Bleeding* is ſcarcely ever to be employed in ſuch caſes; ſince far from giving a ſtimulus to the circulation, it has a tendency to weaken its force.

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* *Query.*—How far is it likely that GALVANISM, the effects of which are not ſo *tranſitory*, may hereafter prove a uſeful agent in the plan of reſuſcitation? See our chapter on the medical uſes of ELECTRICITY and GALVANISM.

§ 3. *Of the* INSTRUMENTS *and* APPARATUS *to be provided.*

As no ſurgeon ſhould be unacquainted with the inſtruments and apparatus neceſſary for the proceſſes of reſuſcitation, and, indeed, ought himſelf (more eſpecially if the place of his reſidence be near a ſea-port town, or a navigable river) to be provided with ſome of them for uſe on the firſt moment of alarm, we ſhall here ſpeak of all that have been hitherto invented.

Deſcription of the Engraving in which the " Implements of Reſtoration from Drowning" *are repreſented.* (Pl. VII.)

Fig. 1, A pair of bellows with two ſeparate bags, ſo contrived that by opening them, when applied to the noſtrils or mouth of a patient, one bag will be filled with common air, and the other with the mephitic air extracted from the lungs; and, by ſhutting them again, pure atmoſpheric air will be introduced into theſe organs, and that drawn out conſequently diſcharged into the room. Thus, the artificial breathing may be continued, while the other operations on the ſurface of the body are carried on; which could not be conveniently done, if the muzzle of a common pair of bellows were introduced into the noſtril.

a, Is an intermediate board, but which admits of no communication between the two bags. In the external board of each ſide, there is the uſual hole, marked *b*, provided with a valve; and the cylindrical part through which the air is expelled in common bellows, is here ſoldered to a copper box, within which two other valves are applied to the tubes conducting the air. The cover *d* of this box, which may be unſcrewed by means of an interpoſed leather ring, is almoſt of the ſhape of a funnel, to the neck of which is faſtened a flexible tube *e* made of varniſhed ſilk cloth, and a ſpiral wire that forms the cavity. To the extremity of this tube is attached a ſmall ivory pipe *f*, the front of which may either be tubular and round, for introducing it into the noſtril; or flat, like the top-piece of a clarionet, if it be intended for the mouth. The valves (which cannot be repreſented in a plate) conſiſt of ſtiffened taffety, and are ſo arranged, that the correſponding ones ſtand in an inverted order. If, therefore, both bags of the bellows be expanded, *two* of the valves open themſelves towards the internal part of the machine: one of theſe is fixed to one of the ſide-boards, but the other is within the box, on the mouth of the conducting tube belonging to the oppoſite bag of the bellows. By this contrivance, the air enters both bags of the bellows at the ſame time, and is, on compreſſion, again expelled by means of two other valves, which open from within toward the external parts. Both bags of the bellows terminate below the valve in one principal tube of communication; becauſe, though the action of both bellows is *ſimultaneous*, the ſtream of air, conformably to the arrangement before pointed out, can only enter, and eſcape, *alternately*.—In uſing this machine, the ſmall ivory pipe is applied either to one of the noſtrils, or put into the mouth: in the former caſe, the other noſtril and the mouth muſt be cloſed; in the latter, both noſtrils. When the bellows are ſet in action, one of the bags receives a column of atmoſpheric air through its valve; while the other, by means of its flexible tube and its valve, extracts a portion of air from the lungs. But, if the bellows are again ſhut, one of the bags parts with the impure gas drawn out of the pulmonary veſſels; and the ſecond conveys pure atmoſpheric air to the organs of reſpiration. By properly repeating this alternate proceſs, the patient may again be enabled to exerciſe the important function of breathing. As, however, a precipitate and irregular method of proceeding might be productive of injury, this delicate operation ought to be performed by perſons who are acquainted with the mechaniſm of reſpiration.—In ſome caſes, where the patient has, for a conſiderable time, lain under water, or was afterwards neglected for want of due aſſiſtance, it would be deſirable to introduce into his lungs *oxygen*, or pure vital dephlogiſticated air, inſtead of that of the common atmoſphere; as the latter is generally more or leſs corrupted on ſuch occaſions by the breath of many perſons in the ſame room. For this purpoſe, may be uſed a bladder, marked *g*, which is provided with a cock and pipe fitted or ſcrewed to the board of the inſpiring valve and bag of the bellows. If, therefore, after opening the cock, the machine is ſet in motion, it will extract the pure air contained in the bladder, and, on the ſubſequent compreſſion of the bellows, force it into the lungs of the patient.

Fig. 2, A machine for injecting the ſmoke of tobacco by way of clyſter, in thoſe deſperate caſes which require the application of this remedy. It conſiſts of a pair of bellows, to the muzzle of which is fitted a metal box, *a*, provided with a ring, in the middle of which it may be unſcrewed, and again cloſed, after being filled with tobacco, and ſet on fire; the pipe *c* (which, by miſtake, is repreſented with a ſharp point in ſome drawings, but ſhould be perfectly round and blunt at the top) of the flexible tube *b*, is introduced into the fundament; and thus, by means of the bellows *d*, the ſmoke is forced into the rectum.

Fig. 3, A bier of wicker-work, in the form of a ſlanting, oblong baſket, for conveying the body of the drowned, in a poſture ſomewhat raiſed. This ſimple contrivance has the advantage, that the water may eaſily run off, while the patient is carried: and, as many unfortunate perſons are materially injured by rough treatment, before they arrive at a houſe of reception, ſo that their recovery is thus often fruſtrated, we recommend the univerſal adoption of this convenient implement. It coſts at Hamburgh only ten marks currency, or about 15s.

Fig. 4, The *Warming Machine* of block tin, or other metal, was originally invented by Mr. Harvey, of London, who ſuggeſted it to our Royal Humane Society, and it was ſubſequently improved by Mr. Braaſch, an ingenious mechanic of Hamburgh. Its object is to procure an uniform degree of warmth, throughout the apparatus, in the moſt expeditious manner, by filling the hollow or double bottom and ſides of the whole implement with boiling water.—*a* is the body of the machine, ſeven feet long, and made of ſolid pieces of block-tin, to prevent the neceſſity of ſoldering them, and conſequently the formation of iron-ruſt: it reſts on two wooden legs *f f*, and may be eaſily carried by the handle *g g*. The water is poured in through both funnels *d*, *d*, in order to warm it more ſpeedily; and each of theſe is provided with a ſtopper as (repreſented in the plate), ſuſpended on a chain, with a view to prevent, if neceſſary, too ſudden evaporation and cooling of the water:—*h* is the intermediate ſpace between the two metallic plates, producing a vacuum of 2½ inches, in which the fluid is diffuſed over the whole machine;—*b* is a wooden deſk to ſupport the head of the patient, and to protect it from the immediate contact with the heated parts; but, on the oppoſite end of the machine, there is an enlarged intermediate ſpace, *c*, for holding ſuch a quantity of water and vapours as will procure an additional, or at leaſt a more permanent, degree of heat towards the lower extremities, than to the trunk of the body. For diſcharging the water when it is not wanted, or changing it when too cold, there is a cock at *e*. The hollow ſides of this machine are about twelve inches high; and in order to enſure an uniform warmth, the body apparently dead ſhould be placed on a ſtraw mattreſs, and tucked in with blankets. A pailful of water is required to fill the whole machine, as a ſmaller quantity would warm the ſides only for a ſhort time, by means of the vapour.

It deſerves to be remarked, that this ingenious contrivance may alſo be uſed for a *warm bath*; for which purpoſe, the inner ſpace in which the body lies, ſhould be ſupplied with water. The whole apparatus, in its preſent improved ſtate, made of *copper*, coſts at Hamburgh about 200 marks, or from 14 to 15l.

Mr. Redlich, a medical practitioner of reſpectability at Hamburgh, one of the moſt active members of the Humane Society in that city, has offered the following articles for ſixty-five marks, or about four guineas and a half. His complete cheſt contains;

Small bottles of rectified ſpirit of wine; white-wine vinegar; ſweet oil; brandy; volatile ſal ammoniac; vitriolic æther.

A ſmall bottle of muſtard-ſeed.

A machine for injecting the ſmoke of tobacco.

A leather tube, together with a pair of bellows, for inflating the lungs.

Another tube of leather, for introducing medicines into the ſtomach.

A ſmall ſyringe for clearing the throat of mucus.

Three woollen covers or blankets.

Four bruſhes, and ſix woollen cloths, for performing friction.

Several emetics.

Two lancets for blood-letting.

One pound of tobacco.

A roller and cuſhion, to be uſed in venæſection.

Two quills, a ſponge, and ſome lint.

A pocket-knife.

An apparatus for ſtriking fire.

Chamomile and elder-flowers.

Common ſalt:—and a printed copy of rules and directions for treating the drowned.

OF ELECTRICITY AND GALVANISM, AND THEIR EFFECTS IN DISEASES.

Although medical electrization is practiſed in the metropolis, and even in ſome of the large towns in Great-Britain, as a diſtinct profeſſion; yet, in remote ſituations, this remedy is for the moſt part adminiſtered by practitioners in ſurgery. This being the caſe, it neceſſarily belongs to a work of this nature to offer ſome inſtructions on the ſubject.

It cannot be denied, that *medical electricity* has been only of late years reduced to a ſyſtematic form, and that we are in *this* reſpect particularly indebted to the labours of Tiſſot *, Cavallo, and Bertholin. The laſt of theſe meritorious characters framed a peculiar theory, according to which he derived all diſeaſes either from the want or abundance of the electric fluid in the human body. He invented ſeveral uſeful inſtruments, and his method of applying them introduced a happy medium between the violent ſhocks recommended by ſome, and the timid practice of electrifying followed by others. By the exertions of ſuch men, we at length arrived at ſtable principles, eſtabliſhed on the broad baſis of experience, by which we were taught, that electricity increaſes or promotes the circulation of the blood, and produces this effect particularly by what is called the *negative bath.* Thus we learned, by ſatisfactory proofs, that the electric fluid operates as a ſtimulating remedy on the animal body, and that in ſituations acceſſible to no other kind of ſtimulus.

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* The celebrated Tiſſot was unqueſtionably the firſt who treated ſcientifically on the medical application of electricity, exhibiting alſo juſt principles on which to found this proceſs, in his claſſical letter, '*De variolis, apoplexia, et hydrope.*';

Meanwhile, the well-known experiments of Galvani with the metallic ſtimulus, excited an uncommon degree of attention in the medical world; but the conſequent theories were too haſtily formed, and purſued with hypothetical fallacy. This ſpecies of ſtimulus is certainly inſufficient to afford a ſure criterion of actual death, and to aſcertain clearly the ſtate of aſphyxia, for this additional and obvious reaſon, that the diſpoſition or tendency of the muſcular fibre to be affected to ſuch a degree as to be thrown into convulſions by the application of metals, is conſiderably diminiſhed in certain diſeaſes, for inſtance, the gout and rheumatiſm; it muſt, however, be admitted that the nerves are very ſenſible electrometers, and that the animating principle which pervades them, is forcibly ſtimulated in the tranſition of the electric fluid from one metal to another.

Whether the medical effects of electricity and Galvaniſm are to be conſidered *alike*, or in what reſpects they differ, are points not yet aſcertained by medical philoſophers, and for that reaſon, we purpoſe treating the ſubjects diſtinctly.

§ 1. *Of* ELECTRICITY.

Electricity is generally thought to be one of the moſt powerful ſtimulating remedies which can be applied to the animal economy. Its effects may be conſidered both as conſtitutional and local. Too violent ſhocks of it at once extinguiſh the vital principle, which, however, may be again kindled or excited by leſs powerful ſhocks. Hence, in ſpeaking of its effects on the conſtitution, the following poſitions may be admitted, to a certain extent, as correct and eſtabliſhed;—that electricity promotes the free circulation of the fluids, and particularly the blood; that it accelerates perſpiration, and increaſes animal heat, and likewiſe promotes all the ſecretions and excretions of the body *. But the moſt accurate way in which we can ſpeak of electricity, as a remedy in local affections, is that ſuggeſted by Mr. Abernethy, viz. that it has a tendency to promote *whatever action or proceſs happens to be going on*, in a diſeaſed part, at the *time of its application.*

In the application of this powerful remedy, the following hints may be of ſervice, as they are the reſult of actual experience, and not of ſpeculation: 1. Electricity is attended with pernicious effects in *active* or *ſthenic* diſeaſes: 2. it is hurtful when, together with relaxation and debility, an uncommonly high degree of excitability in the organs of ſenſation is felt, as well as in thoſe of voluntary motion; and 3. if a preternatural impulſe of the fluids, ariſing from local irritation, prevail in any particular part of the body. In this caſe, electricity has a direct tendency to generate congeſtions, or the local accumulation of humours. In atonic collections of matter it is frequently found of ſervice, when the great vital activity of the ſolids alone is capable of reſolving the ſtagnations; but it is certainly detrimental, if the mechanical power of reſiſtance in the ſolid parts muſt, at the ſame time, be raiſed; and if the accumulated matter muſt be previouſly diminiſhed, before it can be diſcuſſed. Hence the application of electricity has ſometimes been highly beneficial in promoting a regular return of the menſes; but it has alſo, in certain caſes, been attended with injurious effects.—It is further of conſiderable advantage in paſſive or aſthenic diſeaſes, particularly in caſes accompanied with a diminiſhed ſuſceptibility of ſtimuli in the organs of ſenſation and motion; provided that ſuch diſorder at the ſame time, be manifeſt from the periodical returns of uncommon muſcular action, or by occaſional exceſs of the ſenſitive faculty in any particular part. Laſtly, the mode of imparting the electric fluid deſerves more attention than has hitherto been beſtowed upon it; and we ought never to communicate violent ſhocks, where leſs powerful ones might anſwer the purpoſe. Upon the whole, it appears to be an eſtabliſhed maxim that, under the circumſtances and conditions above ſpecified, both the electric bath, and the gentle application of the electric fluid to any particular part of the body, are always ſafe; and that the extraction of ſparks under ſimilar circumſtances is generally attended with advantage. The more violent methods of electrifying, on the contrary, have been productive of miſchief rather than good; ſo that they ought to be applied to thoſe individuals only, whoſe excitability is languid, or whoſe capacity for receiving impreſſions by external ſtimuli, is conſiderably diminiſhed.

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* It may properly be remarked here, that the effect of promoting the ſecretions and excretions by means of electricity, will then only take place when theſe have been diminiſhed by atonic cauſes.

Mr. Cavallo, who has publiſhed the beſt treatiſe on Medical Electricity, entirely diſapproves of giving violent ſhocks, and finds it moſt efficacious to expoſe the patient to the electrical aura diſcharged from an iron or a wooden point; or if ſhocks are given, they ſhould be very ſlight, and not exceed 12 or 14 at a time. In this way he recommends it as effectual in a great number of diſorders. The patient may be electrified from three to ten minutes; but if ſparks are drawn, they ſhould not exceed the number of ſhocks above mentioned.

1. *Rheumatic diſorders*, even of long ſtanding, are relieved, and generally quite cured, by only drawing the electric fluid with a wooden point from the part, or by drawing ſparks through flannel. The operation ſhould be continued for about twenty minutes, repeating it once or twice every day.

2. *Deafneſs*, except when it is occaſioned by obliteration or other improper configuration of the parts, is either entirely or partly

cured by drawing the ſparks from the ear with the glaſs tube director, or by drawing the fluid with a wooden point. Sometimes it is not improper to ſend exceedingly ſmall ſhocks (for inſtance, of one-thirteenth of an inch) from one ear to the other.—It has been conſtantly obſerved, that whenever the ear is electrified, the diſcharge of the wax is conſiderably promoted.

3. *The tooth-ach*, occaſioned by cold, rheumatiſm, or inflammation, is generally relieved by drawing the electric fluid with a point, immediately from the part, and alſo externally from the face. But when the body of the tooth is affected, electrization is of no uſe; for it ſeldom or never relieves the diſorder, and ſometimes increaſes the pain to a prodigious degree.

4. *Swellings* in general, which do not contain any *matter*, are frequently cured by drawing the electric fluid with a wooden point. The operation ſhould be continued for five or ten minutes every day.—It is very remarkable, that in ſome caſes of white ſwellings, quite cured by means of electricity, the bones and cartilages were in ſome meaſure disfigured.

5. *Inflammations* of every ſort have occaſionally been relieved by a very gentle electrization; but if far advanced, its tendency is rather to promote ſuppuration, agreeably to what we have already ſaid of the diſpoſition of electricity to forward any proceſs that ſeems to be *then* going on in the part.

6. In *inflammations of the eyes*, the throwing of the electric fluid by means of a wooden point, is often attended with great benefit; the pain being quickly abated, and the inflammation being generally diſſipated in a few days. In theſe caſes, the eye of the patient muſt be kept open; and care ſhould be taken not to bring the wooden point very near it, for fear of cauſing a ſpark. Sometimes it is ſufficient to throw the fluid with a metal point; for in theſe caſes, too great an irritation ſhould be always avoided. It is not neceſſary to continue this operation for three or four minutes without intermiſſion; but after throwing the fluid for about half a minute, a ſhort time may be allowed to the patient to reſt and to wipe his tears, which generally flow very copiouſly; then the operation may be continued again for another half-minute, and ſo on for four or five times every day.

7. The *gutta ſerena* has been ſometimes cured by electrization; but at the ſame time it muſt be confeſſed, it has proved ineffectual in many ſuch caſes, in which it was adminiſtered for a long time, and with all poſſible attention. However, it has never been known that any body was made worſe by it. The beſt method of adminiſtering electricity in ſuch caſes, is firſt to draw the electric fluid with a wooden point for a ſhort time, and then to ſend about half a dozen of ſhocks of one-twentieth of an inch from the back and lower part of the head to the fore-head, very little above the eye.

A remarkable diſeaſe of the eye was ſome time ago perfectly cured by electrization; it was an opacity of the vitreous humour of the eve.

8. All the caſes of *fiſtula lacrymalis*, which Mr. Cavallo hath known to have been electrified by perſons of ability, for a ſufficient time, have been entirely cured. The method generally practiſed has been that of drawing the fluid with a wooden point, and to take very ſmall ſparks from the part. The operation may be continued for about three or four minutes every day. It is remarked, that in thoſe caſes, after curing the fiſtula lachrymalis, no other diſeaſe was occaſioned by it, as blindneſs, inflammations, &c. by ſuppreſſing that diſcharge.

9. *Palſies* are ſeldom perfectly cured by means of electricity, eſpecially when they are of long ſtanding; but they are generally relieved to a certain degree. The method of electrifying in thoſe caſes, is to draw the fluid with the wooden point, and to draw ſparks through flannel, or through the uſual coverings of the part if they are not too thick. The operation may be continued for about twenty minutes per day.

10. *Ulcers*, or open ſores of every kind, even of a long ſtanding, are generally diſpoſed to heal by electrization. The general effects are a diminution of the inflammation, and at firſt a promotion of the diſcharge of properly formed matter; which diſcharge gradually leſſens, according as the limits of the ſore contract, till it be quite cured. In theſe caſes the gentleſt electrization muſt be uſed, in order to avoid too great an irritation, which is generally hurtful. To draw or throw the fluid with a wooden or even with a metal point, for three or four minutes per day, is fully ſufficient.

11. *Cutaneous eruptions* have been ſucceſsfully treated with electrization; but in theſe caſes it muſt be obſerved, that if the wooden point be kept too near the ſkin, ſo as to cauſe any conſiderable irritation, the eruption will be cauſed to ſpread more; but if the point be kept at about ſix inches diſtance, or farther, if the electrical machine be very powerful, the eruptions will be gradually diminiſhed, till they are quite cured. In this kind of diſeaſe, the immediate and general effect of the wooden point is to occaſion a warmth about the electrified part, which is always a ſign that the electrization is rightly adminiſtered.

12. The application of electricity has perfectly cured various caſes of *St. Vitus's dance*, or of that diſeaſe which is commonly called ſo; for it is the opinion of ſome very learned phyſicians, that the real diſeaſe called *St. Vitus's dance*, which formerly was more frequent than it is at preſent, is different from that which now goes under that name. In this diſeaſe ſhocks of about one tenth of an inch may be ſent through the body in various directions, and alſo ſparks may be taken. But if this treatment prove very diſagreeable to the patient, then the ſhocks muſt be leſſened,

and even omitted; inſtead of which, ſome other more gentle applications muſt be ſubſtituted.

13. *Scrophulous tumors*, when they are juſt beginning, are generally cured by drawing the electric fluid with a wooden or metal point from the part. This is one of thoſe kinds of diſeaſes in which the action of electricity requires particularly the aid of other medicines in order to effect a cure more eaſily; for ſcrophulous affections commonly accompany a great laxity of the habit, and a general cachexy, which muſt be obviated by proper remedies.

14. In *cancers*, the pains only are commonly alleviated by drawing the electric fluid with a wooden or metal point. Mr. Cavallo, however, mentions one caſe in which a moſt confirmed cancer of very long ſtanding, on the breaſt of a woman, had been much reduced in ſize. It is remarkable, that this patient was ſo far relieved by drawing the fluid with a metal point from the part, that the excruciating pains ſhe had ſuffered for many years did almoſt entirely diſappear; and alſo, that when the electric fluid was drawn by means of a wooden point, the pains did rather increaſe.

15. *Abſceſſes*, when they are in their beginning, and in general whenever there is any tendency to form matter, are diſperſed by electrization. Lately, in a caſe in which matter was formed upon the hip, called the *lumbar abſceſs*, the diſeaſe was perfectly cured by means of electricity.* The *ſciatica* has alſo been often cured by it. In all ſuch caſes, the electric fluid muſt be ſent through the part by means of two directors applied to oppoſite parts, and in immediate contact either with the ſkin, or with the coverings, when theſe are very thin. It is very remarkable, that the mere paſſage of the electric fluid in this manner is generally felt by the patients afflicted with thoſe diſorders, nearly as much as a ſmall ſhock is felt by a perſon in good health. Sometimes a few ſhocks have been alſo given, but it ſeems more proper to omit them; becauſe ſometimes, inſtead of diſperſing, they rather accelerate the formation of matter.

16. In caſes of *pulmonary inflammations*, when they are in the beginning, electrization has been ſometimes beneficial; but in confirmed diſeaſes of the lungs, it does not ſeem to have ever afforded any unqueſtionable benefit; however, it ſeems that in ſuch caſes the power of electricity has been but ſeldom tried.

17. *Nervous head-achs*, even of a long-ſtanding, are generally cured by electrization. For this diſeaſe, the electric fluid muſt be thrown with a wooden, and ſometimes even with a metal point, all round the head ſucceſſively. Sometimes exceedingly ſmall ſhocks have been adminiſtered: but theſe can ſeldom be uſed, becauſe the nerves of perſons ſubject to this diſeaſe are ſo very irri-

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* See what has been ſaid on the uſe of electricity in the *Lumbar Abſceſs*, by Mr. Abernethy, Vol. III. p. 533, of this work.

table, that the ſhocks, the ſparks, and ſometimes even the throwing the electric fluid with a wooden point kept very near the head, throw them into convulſions.

18. The application of electricity has often been found beneficial in the *dropſy*, when juſt beginning, or rather in the tendency to a dropſy; but it has never been of any uſe in advanced dropſies. In ſuch caſes, the electric fluid is ſent through the part, in various directions, by means of two directors, and ſparks are alſo drawn acroſs the flannel, or the clothes; keeping the metal rod in contact with them, and ſhifting it continually from place to place. This operation ſhould be continued at leaſt ten minutes, and ſhould be repeated once or twice a-day.—Perhaps in thoſe caſes, a ſimple electrization (viz. to inſulate the patient, and to connect him with the prime conductor whilſt the machine is in action), continued for a conſiderable time, as an hour or two, would be more beneficial.

19. The *gout*, extraordinary as it may appear, has certainly been cured by means of electricity, in various inſtances. The pain has been generally mitigated, and ſometimes the diſeaſe has been removed ſo well as not to return again. In thoſe caſes, the electric fluid has been thrown by means of a wooden point, although ſometimes, when the pain was too great, a metal point only has been uſed.

20. *Agues* have not unfrequently been cured by electricity, ſo that ſometimes one electrization or two have been ſufficient. The moſt effectual and ſure method has been that of drawing ſparks through flannel, or the clothes, for about ten minutes, or a quarter of an hour. The patients may be electrified either at the time of the fit, or a ſhort while before the time in which it is expected.

21. *The ſuppreſſion of the menſes*, which is a diſeaſe of the female ſex that often occaſions the moſt diſagreeable and alarming ſymptoms, is often ſucceſsfully and ſpeedily cured by means of electricity, even when the diſeaſe is of long ſtanding, and after the moſt powerful medicines uſed for it have proved ineffectual. The caſes of this ſort in which electrization has proved uſeleſs are ſo few, and the ſucceſsful ones ſo numerous, that the application of electricity for this diſeaſe may be juſtly conſidered as an efficacious and certain remedy. Great attention and knowledge is required, in order to diſtinguiſh the arreſt of the menſes from a ſtate of pregnancy. In the former, the application of electricity, as we obſerved above, is very beneficial; whereas, in the latter, it may be attended with very diſagreeeble effects: it is therefore a matter of great importance to aſcertain the real cauſe of the diſeaſe, before the electricity be applied in thoſe caſes. Pregnant women may be electrified for other diſeaſes, but always uſing very gentle means, and directing the electric fluid through other parts of the body diſtant from thoſe ſubſervient to generation. In the real ſuppreſ-

ſion of the menſes, ſmall ſhocks, *i. e.* of about one twentieth of an inch, may be ſent through the pelvis; ſparks may be taken through the clothes from the parts adjacent to the ſeat of the diſeaſe; and alſo the electric fluid may be tranſmitted by applying the metallic or wooden extremities of two directors to the hips, in contact with the clothes; part of which may be removed in caſe they be too thick. Thoſe various applications of electricity ſhould be regulated according to the conſtitution of the patient. The number of ſhocks may be about 12 or 14. The other applications may be continued for two or three minutes; repeating the operation every day. But either ſtrong ſhocks, or a ſtronger application of electricity than the patient can conveniently bear, ſhould be carefully avoided; for by thoſe means, ſometimes more than a ſufficient diſcharge is occaſioned, which is not eaſily cured. In caſes of uterine hæmorrhagies, it is not known that the application of electricity was ever beneficial. Perhaps a very gentle electrization, ſo as to keep the patient inſulated and connected with the prime conductor, whilſt the electrical machine is in action, may be of ſome benefit.

22. In reſpect to *unnatural diſcharges* and *fluxes* in general, it may be obſerved, that ſome diſcharges are quite unnatural or adventitious, as the fiſtula lachrymalis, and ſome ſpecies of the venereal diſeaſe; but others are only increaſed natural diſcharges, ſuch as the menſes, perſpiration, &c. Now the power of electricity in general has been found more beneficial for the firſt than for the ſecond ſort of diſcharges, which are moſtly increaſed by it.

23. In the *venereal diſeaſe*, electrization has been generally forbidden; having commonly increaſed the pains, and other ſymptoms, rather than diminiſhed them. Indeed, conſidering that any ſort of ſtimulus has been found hurtful to perſons afflicted with that diſorder, it is no wonder that electricity has produced ſome bad effects, eſpecially in the manner it was adminiſtered ſome time ago, viz. by giving ſtrong ſhocks. However, it has been obſerved by ſome ſurgeons, that a very *gentle* application of electricity, as drawing the fluid by means of a wooden or metal point, is peculiarly beneficial to venereal complaints, even when the diſeaſe has been of long ſtanding. Perhaps, Cit. Coquart's late obſervations on ſome effects of lightning and electricity in gonorrhœa, may throw ſome light on this diſputed point of chirurgical practice.

" Towards the end of July, 1800, Cit. N. aged forty, of a very irritable conſtitution, had a gonorrhœa during fifteen days, attended in the beginning with inflammatory ſymptoms. The patient, however, was ſo far recovered by a proper treatment, that the pains, as well as the running, conſiderably abated. One night when he was ſleeping on his bed, almoſt naked, and with the windows open, he was ſuddenly awakened by the noiſe of thunder; he leaped from his bed, and having walked in the chamber for ſome minutes, he went to bed again. He, however, immediately felt ſome pains in the perinæum, and had a reſtleſs night. The next morning he had a complete ſuppreſſion of urine, and all his attempts to make water produced nothing but a few drops of blood; the running had likewiſe ceaſed. The patient was immediately ordered to be put into a bath, and he then made a little water mixed with blood. About mid-day another bath was uſed, after which the urine proceeded in ſmall ſtreams, and bloody. When he had taken a third bath in the evening, no more blood came off with the urine; and by a ſtrict regimen, the natural flow of the urine was re-eſtabliſhed. The patient went afterwards into the country, and having diſcontinued the baths, the gonorrhœa ſpontaneouſly returned; the matter was milky, and not copious; the pains in the perinæum were ſlight, and only felt at the time of erection. Some time after, the running, and all the other ſymptoms of the gonorrhœa, diſappeared entirely. This obſervation naturally leads to the queſtion, whether the ſuppreſſion of urine is to be attributed to the ſurpriſe of the patient, by being ſo ſuddenly awakened by the noiſe of thunder, or to an electric action? However," adds the author, "this effect of electricity is not quite ſo much proved as in the following obſervation."

"An Engliſhman, who had for the ſpace of two years a running from the urethra, againſt which he had conſulted the beſt practitioners in France and England, without the leaſt ſucceſs, applied at laſt to Citizen Rouelle, phyſician at Loeven, of great reputation. This gentleman having again tried all poſſible internal and external remedies to no purpoſe, had recourſe to electricity, with which he uſed to amuſe himſelf. Having, therefore, introduced into the urinary canal of the patient an iron thread, he drew out of it only one electric ſpark, whereupon the patient inſtantly felt a vehement pain in the perinæum; the gonorrhœa, however, completely diſappeared, and the patient was perfectly cured."

But whether the direct application of this ſtimulus be deſirable or not in the treatment of *venereal ſymptoms*, there is a great ſingularity attends its uſe in thoſe perſons who are *under the effects of a mercurial courſe*. In theſe, the ſhock, or even the ſpark, is attended with *conſiderably more pain* than in common inſtances; and Mr. Hunter, in his Treatiſe on the Veneral Diſeaſe, mentions the caſe of a perſon on whoſe complaint electricity had no effect, *till* mercury was adminiſtered, *after which* the ſame remedy produced a cure. Would not a previous mercurial courſe, therefore, in ſome caſes (particularly of the *atonic* kind) give unexpected efficacy to electrization?

The application of electricity has been found alſo beneficial in ſome other diſeaſes beſides thoſe mentioned above; but as the facts are not ſufficiently numerous to afford the deduction of any general rules, we do not take particular notice of any but the following:

24. Dr. Fricke, of Brunſwick, has lately made ſeveral ſucceſsful experiments, not only to diſcover the *tape-worm*, but likewiſe to deſtroy and expel it, by the powerful aid of electricity. The proper application of the electric fluid, according to his account, almoſt inſtantaneouſly relieves the moſt violent ſymptoms, ſuch as anguiſh, oppreſſion, ſpaſmodic ſtricture in the præcordia, &c. The manner of applying electricity to individuals ſuſpected to be haraſſed by the tape-worm, is as follows:

Dr. F. uſes a conductor with a globe of two inches and a half in diameter, from which he cauſes the ſparks to ſtrike againſt a globe of an inſulated *ſcintillometer*: theſe ſparks he paſſes in different directions through the abdomen; but, at firſt, admits them only from three to four inches long. As ſoon, however, as the patient can conveniently bear this kind of vibration, ſparks to the length of from ten to twelve inches are admitted: and the more powerful theſe are, the more ſpeedy will be the relief.

Dr. Fricke's ſcintillometer conſiſts of a metal cylinder, thirty inches long, which lies inſulated upon a pedeſtal, in a horizontal direction; it is divided into inches, and may be ſlided backwards and forwards. On one extremity, this cylinder is provided with a braſs globe, four inches in diameter, on which the ſparks ſtrike from the conductor: the other extremity is provided with a ring. To this ring he faſtens a metal chain or wire, covered with ſilk, which is connected with an inſulated director. Another director, likewiſe inſulated, is added, by means of a chain, to that part of the machine which performs the friction: and by theſe two directors, which, for the ſake of conveniency, are conjoined like a pair of tongs, the paſſage of the ſparks is conſtantly regulated, while the patient ſits on a common chair.

As the ſymptoms of the tape-worm uſually begin with ſevere tenſion and oppreſſion about the region of the ſtomach, the firſt ſparks are directed through the pit of the ſtomach, in a ſtraight line towards the vertebræ. After ſeveral ſparks have been adminiſtered, eructations frequently take place; the patient feels much relieved in that particular part, but generally perceives the motion of another part of the worm, in ſome other place. Thither the ſparks are again directed, and the worm is inceſſantly purſued, until it can be diſtinctly felt by the patient like a heavy weight.

To a lady who had been much troubled with the tape-worm, Dr. Fricke preſcribed half a drachm of powder of jalap, and carefully applied the electricity in the manner before deſcribed, during the operation of this remedy: in conſequence of ſuch treatment, the patient diſcharged a tape-worm upwards of 20 yards long.

We wiſh, in concluſion, to obſerve, that, in applying *electricity*, the different auxiliary remedies directed in the foregoing parts of this work, are by no means to be forgotten. Indeed this remedy is, at beſt, too uncertain and capricious for us to place implicit confidence in it; and whilſt its powers are *now and then* diſplayed in moſt *wonderful* inſtances, we are liable to repeated diſappointments in employing it even in the moſt ſimple caſes of local diſeaſe*.

§ 2. *On* GALVANISM.

The experiments of modern philoſophers have ſhewn, that certain convulſive motions on the nerves of living and dead animals, may be excited by the application of metallic or other conductors of electricity; but theſe motions may alſo be induced, by ſimply touching the animal fibre with two different metals, that are brought in contact with each other at the ſame moment. Whatever two metals be choſen, they will, with a few exceptions, produce thoſe remarkable contractions, when applied in the manner hereafter deſcribed; but the moſt powerful are, zinc and ſilver, or zinc and gold; or in general, zinc, tin, or lead, when uſed in combination with gold, ſilver, molybdena, ſteel, or copper.

Theſe ſingular phænomena take place in conſequence of a mutual communication between any two points of contact, whether more or leſs diſtant, in a ſyſtem of muſcular and nervous organs. The extent of this communication may be conſidered as a complete circle divided into two parts, one of which, compriſing the organs of the animal under the experiment, is called the *animal arc*, the other, which is formed by the metals or *Galvanic* exciters, is denominated the *excitatory arc*; and conſiſts of more than one piece, of various kinds.

Beſides the effects thus produced on the muſcles, the impreſſions made on the organs of ſenſe are equally remarkable. And as the experiments illuſtrating them may be eaſily repeated, we ſhall ſpecify ſome of the moſt intereſting. For inſtance, if a thin plate of zinc be placed on the upper ſurface of the tongue, and a half-crown, ſhilling, or ſilver tea-ſpoon, be laid on the lower ſurface of the tongue, and both metals after a ſhort ſpace of time be brought into contact, a peculiar ſenſation, ſimilar to taſte, will be perceived at the moment when the mutual touch happens. If the ſilver be put beneath, and the zinc upon the tongue, the ſame ſenſation will ariſe, but in a weaker degree, reſembling diluted ammoniac, from which in all probability it derives its origin.

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* We have thought a deſcription of the electrical apparatus, and the manner of producing and directing the electrical fluid, in different ſhapes, unneceſſary, as theſe are almoſt univerſally known. Thoſe, however, to whom information of this kind is an object, may conſult Mr. Cavallo's work, or the late Mr. George Adams's Treatiſe on Electricity.

If a ſilver probe be introduced as far as convenient into one of the noſtrils, and then be brought into contact with a piece of zinc placed on the tongue, a ſenſation not unlike a ſtrong flaſh of light will be produced in the correſponding eye, at the inſtant of contact. A ſimilar perception will reſult, both at the moment of contact and at that of ſeparation, if one of the metals be applied as high as poſſible between the gums and upper lip, and the other in a ſimilar ſituation with the under lip, or even under the tongue.—Laſtly, when a probe or rod of zinc, and another of ſilver, are introduced as far back as poſſible into the roof of the mouth, the irritations produced by bringing the external ends into contact, are very powerful; and that cauſed by the zinc is ſimilar in taſte to the ſenſation ariſing from its application to the tongue.

But it is on the *vaſt accumulation of this power* in Sign. Volta's apparatus (or *pile*, as it is called), the diſcovery on which the application of Galvaniſm to medical purpoſes chiefly depends. It conſiſts of a number of copper or ſilver plates (which laſt are preferable), together with an equal number of plates compoſed of tin, or ſtill better of zinc, and a ſimilar number of pieces of card, leather, or woollen cloth, the laſt of which ſubſtances appears to be the moſt ſuitable. Theſe laſt ſhould be well ſoaked in water ſaturated with common ſalt, muriat of ammonia, or more effectually with nitre.—The ſilver or copper may be pieces of money, and the plates of zinc may be caſt of the ſame ſize. A pile is then to be formed, by placing a piece of ſilver on a correſponding one of zinc, and on them a piece of wet cloth, or card; which is to be repeated alternately, till the number required be arranged in regular ſucceſſion. But, as the pieces are apt to tumble down, if their numbers be conſiderable, unleſs properly ſecured, it will be adviſable to ſupport them by means of three rods of glaſs, or baked wood, fixed into a flat wooden pedeſtal, and touching the pieces of metal at three equi-diſtant points. Upon theſe rods may be made to ſlide a ſmall circular piece of wood perforated with three holes, which will ſerve to keep the top of the pile firm, and the different layers in cloſe contact. The moiſtened pieces ſhould likewiſe be ſomewhat ſmaller than thoſe of the metal, and gently ſqueezed before they are applied, to prevent the ſuperfluous moiſture from inſinuating itſelf between the pieces of metal; (ſee a repreſentation of this pile in Plate V.) Thus conſtructed, the apparatus affords a perpetual current of the animal-electric fluid, or Galvanic influence, through any conductor that communicates between the uppermoſt and loweſt plate; and, if one hand be applied to the latter, and the other to the higheſt metal, a ſhock will be perceived, which may be repeated as often as the contact is renewed. This ſhock greatly reſembles that given by the torpedo, or *gymnotus electricus*: and, according to the larger ſize of the metallic plates, the ſhock will be proportionably ſtronger. The intenſity of the charge, however, is ſo low, that it cannot penetrate the *dry* ſkin; it will therefore be neceſſary to wet both hands, and to graſp a piece of metal in each, in order to produce the deſired effect: its power may be conſiderably increaſed, both by an elevation of temperature, and by augmenting the number of pieces that compoſe the pile. Thus twenty pieces of each will emit a ſhock, that is very perceptible in the arms; if 100 be employed, a very ſevere but tremulous and continued ſenſation will extend even to the ſhoulders; and, if the ſurface of the ſkin be broken, the action of the Galvanic influence will be uncommonly painful.

The ſenſation of a flaſh or ſhock with this apparatus, does not materially differ from that produced by two ſimple plates; but it may be effected in various ways, eſpecially if one or both hands be applied in a wet ſtate to the loweſt plate of the pile; or any part of the face be brought in contact with a wire communicating with the top piece. Further, if a wire be held between the teeth, ſo as to reſt upon the tongue, that organ, as well as the lips, will become convulſed, the flaſh will appear before the eye, and a very pungent taſte will be perceived in the mouth.

Many other curious facts have tranſpired on this intereſting diſcovery; but, as they have not been hitherto applied to medical purpoſes, we muſt refer the curious reader to Dr. Fowler's "*Eſſay on Animal Electricity*," for a further account, and ſhall proceed to a part of the ſubject moſt eſſential to a work of this kind, namely, the individual purpoſes to which Galvaniſm is applicable in the cure of diſeaſes.

Dr. Auguſtin, of Berlin, in his pamphlet on Galvaniſm and its medical application, after giving a brief but judicious account of its phenomena, concludes with a deſcription of the effects of Volta's column or pile on the human body, and points out the diſeaſes in which it may be ſucceſsfully employed. We cannot poſſibly do the ſubject (*new* as it is in medicine) greater juſtice, than by following ſo excellent a guide.

"When a pile," ſays the doctor, "is properly conſtructed, ſo as to ſhew itſelf perfectly efficacious, a moſt ſenſible ſtroke will be felt, on touching with wet hands, or by means of ſilver ſpoons, the upper and lower extremities of the pile; the ſenſation, however, does not extend itſelf, nor penetrate into the breaſt ſo much as from an electrical ſtroke; but when the chain is continued to be ſhut, the ſenſation becomes more permanent and diſagreeable, which likewiſe takes place on putting each chain into a glaſs of water, and holding each hand in one of the glaſſes. Theſe ſenſations, however, prove more lively when the pile is freſh conſtructed, but decreaſe the longer it ſtands, particularly when the ends of the pile have been combined with each other by the contact of the two chains. It is however ſingular, that the force of the pile may be renewed and reſtored by ſhaking the chains. The pungent pain perceived on touching both ends of the pile with wet fingers increaſes, if he, who touches them, is inſulated. When ſeveral perſons take hold of one-another by the hands, which muſt be wet, and when thoſe at the two ends touch the two extremities of the pile, all of them receive a ſlight ſenſation, which is not ſo ſtrong as in a ſingle perſon, though it becomes ſtronger if they are inſulated. The commotions become evidently more lively on moiſtening the fingers, with which the extremities of the pile are touched, with a ſolution of common ſalt, but they are the moſt forcible if a part of the touching fingers is deprived of its epidermis. Galvaniſm, applied by means of Volta's pile, ſhews a moſt ſenſible effect on the organs of ſenſe, and particularly on the eyes; for on applying the two wires of the zinc and ſilver ſide on the ſkin beneath the eye-lids, which has been previouſly moiſtened with ſalt water, a burning pain will ariſe, and the light be put into a vibrating motion alternately in both eyes, which continues as long as the wires remain at the above place. The ſame phenomenon appears, when we touch with one hand a wire that is placed in a glaſs of water, whilſt we apply the wet eye-lid to the metallic plate of the upper extremity of the pile. The vibration of light, however, is particularly ſtrong on applying one wire on a ſpot above the eye-brow that has been previouſly deprived of its epidermis, and on putting the other wire into the noſe or mouth; as the flaſhes of lightning and the ſtrokes, which then extend themſelves through the whole head, are frequently ſo violent and ſtupefying, as to cauſe lipothymies, when the pile conſiſts of twenty or thirty ſtrata. The other organs of ſenſe are likewiſe evidently affected from Galvaniſm by means of Volta's pile. On bringing, for inſtance, the wire *a*, fig. 1 (Pl. V.), into the ear that has been previouſly moiſtened, whilſt the other wire, *b*, fig. 1, is held by the hand in a glaſs of water, a ſtroke and a ſtrong ſound will be perceived in the ear, which becomes more benumbed if the wire *b* is taken out of the water and applied to the other ear, ſo as to bring both into the connection of the chains. On twiſting wire about the ears, moiſtened with ſalt water, ſo that the ends of the wire can be immerſed into glaſſes of water, in which the chains faſtened at the extremities of the pile are placed, a giddineſs is occaſioned, and moſt beautiful flaſhes of lightning will be ſeen. The ſenſations of ſound, however, and tingling in the ear, become particularly ſtrong when we put a conductor applied to the Euſtachian tube in combination with a chain. On dipping a finger into one of the above glaſſes, and into the other a zinc bar, and touching this with the tongue, inſupportable pains will be felt, a flaſh of lightning be ſeen, and a ſingular ſouriſh taſte remain ſome time after. Theſe phenomena, however, are found to differ remarkably by the manner in which the chains are touched, whether by the ſilver ſide or by the zinc ſide of the pile, or whether they are connected or ſeparated; becauſe, in caſe of either ſhutting or diſuniting the chains, the feelings ariſing from the ſilver ſide and that from the zinc ſide are always oppoſite to one another; and what is moſt curious, the ſenſation which is occaſioned on ſhutting the chains at the ſilver ſide is exactly the ſame as the zinc ſide, when the chains are disjoined, while the feeling at the ſilver ſide changes into that which was perceived on the zinc ſide when the chains were ſhut, and *vice verſa*. Thus, for inſtance, in the ſtrokes perceived in the fingers, the finger at the zinc wire *b*, of Volta's pile, feels a ſenſation as if a ſtring was tied round it, whereas a diſagreeable pungent feeling paſſes through the finger at the ſilver wire from the point of contact in all directions; but on disjoining the chain this ſenſation changes, ſo that what the finger at the ſilver wire felt, is then felt by the finger of the zinc wire, and *vice verſa*. When the circle or chain is formed, by means of the tongue, by bringing it into contact with the ſilver wire *b*, fig. 1, of the battery, whilſt one end is applied to the zinc wire, a very ſtrong ſhock will be perceived in the tongue, from which an impreſſion remains at the ſpot where the ſhock took place. On forming the chain with the tongue, applied at the ſilver ſide, a very diſagreeable ſhock is produced, which leaves behind it a feeling as if a hole was ſtruck into the tongue. When the tongue is brought into contact with the zinc ſide, and the circle formed by another part of the body, a ſenſation of heat will be felt, together with the ſhock and the ſouriſh taſte, which, however, on disjoining the chains, is changed into the oppoſite ſenſation of cold, and *vice verſa*, when the tongue is in contact with the ſilver ſide. The ſenſations produced in the noſe differ likewiſe according to the manner of applying the wire; when we apply the ſilver wire, an inclination to ſneeze will ariſe, which is not the caſe with the zinc wire. On bringing the ear in contact with the zinc ſide of the battery, a clear ſound is perceived, which becomes ſtronger when the ear is brought in contact with the ſilver ſide. The phenomena produced in the eyes differ alſo according to the different manner in which the eye is brought in contact with Volta's pile."

From theſe ſtatements it appears, how much the medical uſe of Galvaniſm deſerves to be recommended, and that, notwithſtanding the few practical obſervations which have hitherto been made on that ſubject, we are entitled to expect no inconſiderable advantages from ſo powerful and penetrating a ſtimulus. In employing it, however, for the cure of diſeaſes, we ſhould always conſider the topical as well as the general ſtate of irritability, in order to prevent any bad conſequences which may ariſe by applying too ſtrong a degree of this ſtimulus. A ſtrong Galvanic ſhock generally occaſions laſſitude and a kind of lameneſs, which continues for a whole day, particularly if we have for any long time expoſed our ſelves to the action of the battery. Thus, Mr. Rutter, a gentleman to whoſe ingenious experiments we are particularly indebted for many intereſting explanations with reſpect to this ſubject, felt a general indiſpoſition, attended with weearineſs and dulneſs in the head, after having expoſed himſelf for a whole hour to the action of a ſtrong battery, which conſiſted of 100 ſtrata. Inflammations of the eyes after continued experiments with light, debilitated inſenſibility of the tongue, catarrhs after frequent experiments in the noſe, vertigo and head-ach after violent ſtrokes through the head, and tooth-ach, which always enſue after any experiment being for ſome time continued at any of the above parts of the head, are the common conſequences of Galvaniſing, which undoubtedly ariſe from this ſtimulus having acted too violently on the healthy degree of irritability. In diſeaſes, therefore, where a great irritability prevails, attended with debility, we ought only to employ it in a weak degree; but in paralyſes from indirect debility, we may immediately begin with violent commotions. Regard ſhould alſo be had to the organ on which we intend to act. The weakeſt degree of Galvaniſm is produced by means of two ſmall metallic plates, which are placed near each other on any part of the body, that has been previouſly deprived of its epidermis.—The diſeaſes in which it is ſuppoſed the application of Galvaniſm may be attended with ſucceſs, are the following:

1. *Aſphyxia and apparent death.* Mr. Creve has already recommended, as the ſureſt method of examining the real or apparent death of a perſon, to apply one branch of an arch, conſiſting of two metals, to a brachial nerve, previouſly laid bare, and the other branch on a neighbouring muſcle, in order to excite powerfully by this ſimple Galvanic chain the debilitated irritability. The coating of the nerve, however, being not neceſſary, as a ſlight wound of the ſkin is ſufficient for admitting the action of Galvaniſm, ſmall inciſions made with a ſcarificator will fully anſwer the above purpoſe. To theſe inciſions the Galvanic power is to be led by means of the two conductors *c c*, fig. 1, which muſt be applied at a ſmall diſtance from one another. On perceiving convulſions, we may conclude that there is ſtill incitability left in the body; but when no commotions are produced by the ſtrongeſt Volta's pile, a total want of vital power muſt be ſuppoſed, provided the battery is in ſuch a ſtate as to ſhew itſelf perfectly efficacious. The ſame method may be obſerved in aſphyxia; we ought, however, always to begin with a few ſtrata, and to increaſe them by degrees with great precaution, for fear of extinguiſhing the ſmall quantity of vital power that may be ſtill exiſtent. For this purpoſe, Volta's battery ſeems to be far better calculated than any other manner of applying electricity, becauſe the neceſſary degree of ſtimulus can be eaſier adapted to the degree of incitation by Volta's pile; beſides, its conſtituent parts are more portable than an electrical machine.

2. *Paralyſes.* Under this great claſs of nervous diſeaſes, we can only comprehend ſuch as do not ariſe from organic defects, as, a preſſure of the nerve, a luxation of the vertebræ lumbares, or a kyphoſis, but which originate in an internal indiſpoſition of the nerves; whence, for inſtance, the common hemiplegies from indirect aſthenia and any topical debility or inactivity of the nervous ſyſtem. In order to apply the Galvaniſm in a paralyſis of the extremities, two ſmall ſpots above the place where the nerve runs, viz. at the thigh above the iſchiatic nerve, and at the arm above the nervus cutancus externus, are deprived of their epidermis; and when they are ſufficiently moiſtened, the Galvaniſm of Volta's battery is conducted to them by means of the two chains *a b*, and the conductor *c c*, which muſt be taken by the glaſs tube and moved on the excoriated places. When the paralyſis is attended with a high degree of inſenſibility, or a total loſs of motion as well as ſenſation, the Galvaniſm ſhould be applied in a ſtrong degree, in order to excite the nervous power, and to accelerate the proceſs of life by this new and penetrating ſtimulus; which being done, the number of ſtrata muſt be afterwards diminiſhed, ſo that by degrees a leſs degree of this ſtimulus acts with the ſame force as a greater one did before. By obſerving this rule, we ſucceeded ſome time ago in reſtoring ſenſation perfectly, and motion for the moſt part, with cauſing at firſt ſtrong commotions by a battery of ſixty ſtrata in a hemiplegia from indirect debility, attended with total inſenſibility, in a patient ſixty-ſix years of age; but as the limb was vehemently convulſed, and became ſo painful to the patient, that ſhe refuſed a continuation of theſe experiments, the cure could not be performed merely by Galvaniſm, but recourſe was had to the uſe of other excitant remedies.

3. *Nervous diſeaſes from direct aſthenia*, in which the irritability is ſo much accumulated, that all ſtimuli produce too violent and preternatural ſenſations: of this kind are ſpaſms, convulſions, chorea St. Viti, but particularly triſmus and tetanus. The firſt application of a powerful ſtimulus ought naturally to be weak in theſe diſeaſes, and which is to be done by means of two different metallic plates, which being faſtened to a leather ſtrap, are applied at two places, and brought into contact with each other by means of the conducting arch, fig. 4. Theſe places, however, muſt have been previouſly excoriated by bliſters, or wounded by the ſcarificator. When no effect enſues on the application of theſe ſingle plates, we ought to combine them with one another, and thus increaſe by degrees the number of ſtrata and the force of Galvaniſm. By immediately beginning with ſtrong Galvanic ſhocks in theſe directly aſthenic diſeaſes, we might probably do more harm than good; and violent pains and convulſions have ariſen from the application of a ſtrong Galvanic battery with forty or fifty ſtrata, in

a patient affected with a continual motion and a great ſenſibility of the lower extremities; whereas the uſe of Galvaniſm, from a few ſtrata, ſeemed perfectly to agree with him. The application of this ſtimulus in caſes of triſmus and tetanus has not yet occurred to us; but it may be ſuppoſed, in all probability, that thoſe diſeaſes ariſing from a total torpor in the muſcles, which originates in the nerves, may be removed by a ſtimulus that ſhews itſelf ſo powerful in ſimilar affections. We ſhould, however, think it adviſable, in this caſe, to increaſe the force of the battery more ſuddenly.

4. *Weakneſs of ſight and amauroſis.* Galvaniſm muſt be employed here with the utmoſt precaution, particularly in the firſt caſe. One of the chains, fig. 1, *b*, being placed in a glaſs of water, the patient is ordered to hold his hand in it, while the conductor of the chain, *a*, is applied to the eye-lid, which muſt be previouſly moiſtened. The flaſhes of lightning which then appear, become ſtronger or weaker according to the number of ſtrata of which the battery conſiſts; but we ſhould begin with a few ſtrata, and only increaſe them by degrees. In a perfect amauroſis, however, we ſhould uſe a more violent degree of Galvaniſm; to which end a bliſter being applied above the eye-brows of the diſeaſed eye, near the glabella, the patient is ordered to put a wire, fig. 1, *b*, into the mouth or the noſe at the ſide of the diſeaſed eye, and the conductor of the chain, fig. 1, *a*, is then brought in contact with the place deprived of its epidermis by means of the bliſter. For the beginning, ten ſtrata are ſufficient, which may be afterwards increaſed. Patience and perſeverance are required for performing ſuch a cure. Dr. A. ſucceeded in this caſe, though not till after an experiment eight times repeated, in producing ſome change in the diſeaſed eye: for after having increaſed the ſtrata to thirty-five, at the ninth experiment a ſlight glance of light was produced, which was ſlowly augmented. He has not experienced any quicker effect of Galvaniſm in amauroſis, and is therefore inclined to think the accounts of amauroſis being cured by Galvaniſm in a ſhort ſpace of time exaggerated, though it may prove of quicker and better effect in the beginning of an amauroſis. There is, however, a kind of amauroſis, which originates from a congeſtion of blood towards the head, where Galvaniſm is by no means indicated, but where topical venæſection, foot-baths, and the application of cold water on the eye, are of the beſt ſervice.

5. *Difficulty of hearing and deafneſs.* As theſe affections ariſe from different cauſes, in which Galvaniſm is of no uſe, we can only expect advantage in thoſe caſes where a paralyſis of the acouſtic nerve is to be removed, and perhaps alſo where the ſecretion of the ear-wax is to be promoted. In total deafneſs from a paralytic ſtate of the acouſtic nerve, we uſe immediately in the beginning a battery of twenty or thirty ſtrata; but in difficulty of hear-

ing, a leſs degree of Galvaniſm is to be applied. The beſt mode of application in the above affections is the following: A place behind each ear, on the proceſſus maſtoideus, being deprived of its epidermis, a zinc plate is applied on one ſide, and a ſilver plate on the other, by means of the bandage repreſented in fig. 5. This bandage conſiſts of a hoop of whalebone, which is faſtened by means of a cap round the occiput, and of a ribband tied under the chin; on the two ends of this hoop we can ſcrew the plates, fig. 5, *a*, which being brought in combination by means of a ſilver chain, are ſuffered to lie for ſeveral days: a humming ſound ariſes now in both ears, and an acrid ſerum iſſues from the ſore places; particularly from that touched by the zinc plate, which ſtrongly calcines, and on account of its violent effect muſt be frequently changed with the ſilver plate. This mode of applying a ſimple Galvanic chain is frequently efficient enough, as a powerful ſtimulus, in deafneſs from metaſtaſes of a morbid matter, and in that kind of difficult hearing which ariſes from a dryneſs of the internal ſurface of the tympanum, to be diſtinguiſhed by the patient's hearing better through the mouth than through the auditory canal, and by the dryneſs of the membrana pituitoſa of the noſe. In that kind of deafneſs, however, which is attended with a want of the ear wax, it is rather adviſable to bring the conductors of Volta's battery, fig. 1, *c c*, into the auditory canal, which muſt be previouſly moiſtened; for this purpoſe we can make uſe of the apparatus, fig. 5, *b*, conſiſting of a braſs cylinder or nut, fig. 5, *b*, over which the conductor is moved into the ear as far as we think proper. The ſtrongeſt action of Galvaniſm, on the organ of hearing, is produced by bringing a curved wire, fig. 6, into the Euſtachian tube, which being put in connection with one chain, the patient is ordered to hold the other in the wet hand.

6. *Aphonia and hoarſeneſs.* Theſe affections may alſo originate from different organic leſions, viz. abſciſſion of the nervus recurrens, &c. in which Galvaniſm is of no ſervice; but where obſtructions in the glands and a paralyſis of the above nerve, or of the muſcles of the tongue, take place, it proves undoubtedly of great effect. To this end a leather ſtrap, fig. 3, may be uſed, by means of which the zinc and ſilver plates are faſtened on two ſpots, deprived of their epidermis, above the muſculus ſternocleido maſtoideus, near the larynx: the plates are brought into connection by the conducting metallic arch, fig. 4, which can be widened and ſhut at *a*. The effect of Galvaniſm may be increaſed by applying the two conductors, fig. 1, *c c*, Dr. Grapengieſſer ſucceeded in this manner in removing, in the ſpace of twenty-four hours, an aphonia that had laſted ten years.

7. *Chronic rheumatiſm with rigidity of the limbs and joints.*

8. *Cold ſwellings and aſthenic inflammations.*

9. *Tooth-ach.*

10. *Oedema and dropſy*; in which the activity of the abſorbent veſſels is to be reſtored or increaſed.

On the whole, we may avail ourſelves of Galvaniſm in any aſthenic diſeaſe; but we ſhould always regard the difference between direct and indirect aſthenia, if we intend to do any good by the application of that powerful ſtimulus.

The following is a connected explanation of the GALVANIC APPARATUS exhibited in the plate:

Fig. 1. Volta's battery between four glaſs pillars, with the diſcharging chains, *a b*, and the conductors, *c c*, faſtened to them, which conſiſt of wires paſſing through glaſs tubes.

Fig. 2. One of the braſs plates, which are placed one on, and the other under, the pillars, and to which the chains, *a b*, fig. 1. are faſtened.

Fig. 3. Two metallic plates, the one of zinc the other of ſilver, which are faſtened by buttons in a leather ſtrap; to be applied in aphonia and hoarſeneſs.

Fig. 4. The conducting arch, by means of which the connection between the two plates is formed.

Fig. 5. A bandage for the head, for the application of Galvaniſm in caſes of deafneſs, conſiſting of a piece of whalebone to paſs over the back of the head, which is to be faſtened by a cap on the head and a band under the throat; to the two ends of which two plates of different metal can be ſcrewed, over the proceſſus maſtoideus, and the apparatus above deſcribed.

Fig. 6. An inſulating wire paſſing through a glaſs tube, the upper end of which is provided with a button, and conſiſts of fine ſteel, in order to bring it conveniently into the Euſtachian tube.

OF NEW INSTRUMENTS FOR SURGICAL OPERATIONS, &c.

IN the foregoing ſheets mention has occaſionally been made of new or improved inſtruments employed in ſurgery; but as ſome of theſe ſtill remain to be noticed, we cloſe the preſent volume with the accounts given of them by their different inventors and recommenders.

1. *For Lithotomy.*] In the Medical and Phyſical Journal (a work to which we have many obligations, particularly for the delineations now to be ſpoken of), Mr. Carliſle, ſurgeon to the Weſtminſter hoſpital, gives the following account of an inſtrument uſed in cutting for the ſtone, by M. Deſſault, and which, from his own experience, he is diſpoſed to recommend.

“ The various alterations,” ſays Mr. Carliſle, “ which eminent Lithotomiſts had given to the gorget, made me ſuſpect the fitneſs of that inſtrument for its deſtination. The operations on the dead ſubjects ſtill more encouraged my ſuſpicions. The conical gorgets were almoſt abandoned; and the tearing effects produced by them, were found to be ſufficient objections among junior practitioners. The form and extent of the cutting edge of the improved gorgets are adapted to the taſte of each operator. The obliquity of the angle, formed by the cutting end of the gorget with its barrel, has been alſo a ſubject of much variety. It would be very unprofitable, at this day, to enter into a hiſtory of the various modes in which lithotomy has been performed, or the tools with which the operators have executed their work. Much experience has been already recorded, improvements have gradually been made, and we look back with thankfulneſs on thoſe who have contributed to the preſervation of human life, and with hope to thoſe who may ſtill aſſiſt in the alleviation of miſery. It appears to me, that one very deſirable point in the operation of lithotomy, is to make a rapid and clean cut opening into the bladder. The gorget, with an edge at nearly right angles with the grooved part, is puſhed through the bulbous portion of the urethra, the ſurrounding cellular ſubſtance, proſtate gland, and whatever portion of the bladder may be cut, with a direction of force like that of digging with a ſpade. If the patient ſhould be emaciated, and the ſurrounding cellular ſubſtance looſe in its texture, the bladder may be puſhed beyond the end of the ſtaff before the tougher part gives way, and thus both apparatus ſlip between the bladder and rectum. I think that I have ſeen this happen under a ſkilful hand. If the mechanical puſh required be conſiderable, the beak of the gorget is kept in the groove of the ſtaff with difficulty and uncertainty. When a gorget with a cutting edge at a more acute angle is uſed, there is danger of the point reaching the furtheſt ſide of the bladder, before the ſhoulder gets in; or, as has really happened, it may ſuddenly ſlip by the unforeſeen yielding of the parts, and paſs through the back of the bladder into the rectum. It ſeems convincing to my mind, that theſe dangers and difficulties are removed by uſing the Biſtoire Caché. The operation being conducted in the uſual manner, and the groove of the ſtaff laid bare, this inſtrument is made to ſlide into the bladder, without either cutting or tearing. When the ſtaff is withdrawn, the operator can meaſure the diſtance of the bladder, by feeling its poſterior ſurface; and pulling out a little, ſo that his knife ſhall clear that ſurface, he executes the dark and dangerous part of this operation by a clean drawing cut. The ſame parts are neceſſarily divided in this method as when the gorget is uſed, and no more. The advantages of it are derived from the certainty of the opening into the bladder, and of the parts remaining in their places ſuffering only a ſimple inciſion."

This inſtrument is repreſented in Pl. VII. and the following is a deſcription of its different parts:

Fig. I. Is the complete inſtrument.

A. The wooden handle, carved, to ſecure it from ſlipping.

B. A ſcrew, whoſe head is the prop of the lever D, attached to the cutting blade; and by raiſing or depreſſing this ſcrew, the knife is made to gape at ſuch a diſtance from the ſheath as may ſuit the age, &c. of the patient.

C. A ſpring which preſſes the lever D, outwards, keeping the blade within its ſheath.

D. The lever alluded to.

Fig. II. The lever and cutting blade ſeparated from the handle and ſheath.

A. A rounded and probe-pointed termination given to the cutting blade, for the purpoſe of avoiding any end-laceration.

Fig. III. The complete inſtrument, having the blade expoſed, by repreſenting the lever depreſſed.

To this account immediately ſucceeds a deſcription of a new inſtrument for operating for the ſtone, by Mr. Robert Watt, ſurgeon, in Paiſley, who ſpeaks of it in theſe words:

"In every operation, our chief object ſhould be, to avoid every poſſibility of danger, and to render it as little painful to the patient as poſſible. In operating for the ſtone with the common inſtruments, the danger and pains are both very conſiderable: there is a danger of the beak of the gorget getting out of the groove of the ſtaff, and injuring the parts, which may endanger the patient's life. This accident has frequently happened, not only to new beginners, but alſo to ſome who have previouſly operated with ſucceſs. Though we ſhould enter the bladder in the very place where we wiſh, ſtill there is a danger of wounding its back or fundus, if the inſtrument is not immediately withdrawn before the urine be diſcharged, and the bladder begins to contract: this may, in ſome meaſure, be prevented by the double gorget propoſed by Dr. Monro, and improved by Dr. Jeffery. The addition, however, renders the inſtrument bulky, and more difficult to be introduced.

"It ſometimes happens too, that the bladder is ſo contracted by the irritation of the ſtone, that it can neither be diſtended by the urine, nor any other means we can uſe. In ſuch caſes, where the fundus has fallen down to the ſphincter, there is ſcarce a poſſibility of operating with any of the common inſtruments, without making an inciſion in the one as well as the other. The inſtrument propoſed by *Frere Coſmé*, would, in ſuch caſes, upon entering through the ſphincter of the bladder, carry the fundus before them in ſuch a manner, that the knife, when raiſed out of the groove, would infallibly make an inciſion in it.

"Theſe difficulties ſeem, in ſome meaſure, to be removed by the inſtrument now propoſed (ſee Pl. VII.); the manner of operating with which is as follows: Having introduced the ſtaff, and made an inciſion upon it, through the membranous part of the urethra, as is done in performing the lateral operation, the inſtrument, with the cutting part concealed, is introduced along the groove of the ſtaff, till it has fairly entered the bladder; the ſtaff may now be withdrawn, and the ſtone being diſtinctly felt by the end of the inſtrument, the thumb is applied to the button, and preſſed forward, gradually raiſing the cutting part out of the groove till it aſſume the form of fig. 5. The edge being now in the proper direction, we withdraw the whole inſtrument, and an opening is made, equal to the diſtance from M to N, fig. 5, which can be made greater or leſſer, according as we expect a large or ſmall ſtone, or according to the age of the patient.

"With this inſtrument, although the fundus of the bladder ſhould be fallen down to the ſphincter, there will be little danger of its being wounded. For the inſtrument, with the cutting part concealed, being introduced two or three inches within the ſphincter, according to the ſize of the bladder, the prop riſing gradually out of the groove till it comes to a right angle with the ſtem, effectually removes any part of the bladder which may be lying along the ſide of the inſtrument; a circumſtance which renders it greatly ſuperior to that of *Frère Coſmé*. In his, the cutting part goes nearly as far forward as the end of the ſtem, ſo that upon raiſing the knife out of the groove, every thing along the ſide of the inſtrument muſt inevitably be cut through; whereas, in the one now propoſed, the cutting part, when it begins to riſe out of the groove, is at leaſt an inch, or an inch and a quarter, behind the end of the ſtem.

"Another and very important advantage attending this inſtrument is, that it cuts eaſier than the cutting director, or common gorget. It often happens, that a conſiderable degree of force muſt be applied, in order to run the gorget forward into the bladder; and owing to its elaſticity, it flies before the edge of the inſtrument, ſo that a fair inciſion can ſcarcely be made: whereas, by evolving the inſtrument within the bladder, and drawing it out, an inciſion can be made with the greateſt eaſe. Having once felt the ſtone with the point of the inſtrument, and elevated the blade, all we have to do, is to cut what is between it and the outſide, ſo that a miſtake can ſcarcely happen. Here it is impoſſible for the bladder, as in the other caſe, to recede by its elaſticity from the edge of the inſtrument, or the inſtrument to miſs the bladder, or wound it in a wrong place. In this part of the operation with the common gorget, we are working very much in the dark. From our knowledge of the anatomy of the parts, we flatter ourſelves, that it is impoſſible we can go wrong; but ſtill the fatal blunders which are daily committed, ſhew us how far we are miſtaken.

"In ſome caſes, after the inciſion is made with the gorget into the bladder, the ſtone being conſiderably larger than we expected, hence we find it impoſſible to contract it, without either lacerating the parts, or enlarging the wound by a ſecond inciſion; the former ought undoubtedly to be avoided, and the latter can ſcarcely be accompliſhed with ſafety, by any of the common inſtruments. For, after an effort has been made to extract the ſtone, the bladder contracts ſo cloſely, that the inciſion cannot be enlarged, either with a ſcalpel or gorget, without cutting through both its ſides. This, however, may be done with the inſtrument now propoſed, by introducing one of a larger ſize, with the cutting part concealed two or three inches within the ſphincter, as at firſt; then reaching forward the fore finger of the left hand to guard the edge, till it reach the external angle of the firſt inciſion; then withdrawing the whole, the wound will be enlarged equal to the difference between M, N, in the two inſtruments.

"I may obſerve, that if this inſtrument, upon further trial, ſhall be found to anſwer the purpoſe as well upon the living ſubject as it has been found to do upon the dead, it will render the operation ſafe, and the apparatus extremely ſimple. In operating upon the female, nothing further will be neceſſary than a pair of forceps to extract the ſtone. Upon the male, a ſtaff, a ſcalpel, and a pair of forceps, will form the whole apparatus. Nothing enhances the value of an inſtrument ſo much as the ſimplicity of its conſtruction, and the eaſe and ſafety with which it can be uſed. Theſe were the objects I had in view; how far I have ſucceeded, experience only can determine."

The following is an explanation of the figures in Pl. VII.

Fig. IV. repreſents the inſtrument of a middle ſize, with the prop and cutting part concealed in the groove A. D, a plate of ſteel continued from the end of the ſtem B, covering the wooden part of the handle E. The handle would perhaps anſwer the purpoſe much better, were it a little longer than it is here repreſented. Fig. II. gives a front view, having the button C preſſed forward to K, by which the blade F, and prop P, are elevated out of the groove, and in the poſition in which they ſhould be, when the operator withdraws the inſtrument from the bladder. M, a ſcrew, which being taken out, and the button C ſcrewed off the prop and blade, may be withdrawn from the groove and cleaned. Fig. VI. repreſents the prop, cutting part, and wire, taken out from the inſtrument. By making the joint G with a ſmall ſcrew, and having two or three props of different lengths, the ſame inſtrument will then ſerve to make a large or a ſmall inciſion, as the caſe may require. Fig. VII. the button ſcrewed off from the end of the wire O. This ought to be made hollow upon the outſide, with rough edges, ſo that the thumb of the operator may not readily ſlip off.

Mr. Watt ſays, "I have ſometimes thought, that a ſmall ſpiral ſpring within the inſtrument at B, might be of ſervice. It would ſlightly reſiſt the preſſure of the thumb, when applied to the button, by which means the cutting part could be more ſteadily elevated; and when the thumb was removed, it would replace the whole in their former poſition. Owing, however, to the ſmallneſs of the tube at B, the maker would perhaps find it difficult to give it this addition."

2. *For the fiſtula in ano.*] The following deſcription of a new inſtrument for performing the operation for the fiſtula in ano, is given by Mr. WHATELY, ſurgeon, in London.

"Simplicity of conſtruction," ſays he, "is certainly a great recommendation to all inſtruments employed in ſurgical operations. We are not, however, to give the preference to any merely on account of their ſimplicity, as it may happen that the more complex may ſometimes be better calculated to perform the operation in a proper manner; this is the caſe with Pott's inſtruments for performing the operation for the radical cure of the hydrocele, which I know, from experience, anſwer better than the more ſimple Seton lancet uſed by Mr. Hunter for the ſame purpoſe.

"The ingenuity of artiſts has been frequently exerciſed in contriving an eligible inſtrument for cutting for the fiſtula in ano; an operation which conſiſts in dividing a portion of the rectum and of the adipoſe membrane and the ſphincter ani, ſo as to lay open the ſinus or ſinuſes which conſtitute the diſeaſe. If theſe ſinuſes are not completely laid open, or if the diviſion be made in an improper place, the firſt operation ſometimes fails of making a perfect cure. Any of the inſtruments which have been made for this purpoſe may anſwer the intention in particular caſes very well; but the blunt-pointed crooked biſtoury, recommended by that excellent ſurgeon Mr. Pott, certainly has the pre-eminence, and when the operation is performed after the recent burſting of abſceſſes in theſe parts, or where the external orifice is open enough to admit readily the paſſage of the knife, there is perhaps no inſtrument more eligible.

"There are, however, many caſes of fiſtula in ano, in which I think a better inſtrument may be uſed. It frequently happens in thoſe of long ſtanding (which oftener come under the operator's care than the more recent ones), that the external orifice is very ſmall; ſometimes ſcarcely large enough to receive the point of a common probe. In ſome of theſe caſes, the fiſtulous cavity leading to the gut may be eaſily traced by a probe. In others, either on account of ſmall windings in the cavity, or from other obſtructions which the probe meets with in exploring it, a little time is required in the examination, in order to aſcertain the direction and extent of the ſinus; and whether it communicates with the cavity of the rectum by a direct opening through the gut, or runs on its outſide only, without ſuch a communication with its cavity. When the external orifice of the fiſtula is very ſmall, it will not be poſſible in ſome caſes, eſpecially where a patient is timid, to paſs the probe-pointed knife ſo as to meet the finger, without its wounding more or leſs ſome of the parts in its paſſage. If the true direction of the ſinus be not followed after the introduction of the knife, it muſt be apparent to every one, that it cannot be explored without giving much unneceſſary pain, by an inſtrument that is liable to cut. And although it may not be difficult to puſh the inſtrument within the cavity of the rectum, ſo as to meet the operator's finger, yet it appears highly probable that this perforation may ſometimes be made in a different part to that which was intended; an error which may occaſion a failure in the cure. Sometimes we find the orifice of the fiſtula ſituated upon the buttocks, at the diſtance of three or four inches from the anus: in this caſe, the external ſinus muſt be in part opened by the knife, before the probe point of it can poſſibly reach the operator's finger; and this may occaſion ſome difficulty in finding the true direction of the ſinus.

" Theſe circumſtances led me to adopt a new inſtrument, which is the ſubject of this paper. This inſtrument conſiſts of a very narrow probe-pointed curved knife *, with a ring affixed to its handle (Pl. VII. fig. 1), and a ſheath on its blade, having a ſcrew fixed to one end of it, to confine the knife and the ſheath together (fig. 2). By the handle of this ſcrew, the operator's aſſiſtant may draw off the ſheath from the knife. At the point of the ſheath there is a very fine diviſion in its central part, to the extent of a quarter of an inch, in order to prevent the edge of the knife being injured in withdrawing it. While both parts are fixed together, they make a perfectly ſmooth and uniform inſtrument, not unlike a curved probe (fig. 3). This inſtrument may be introduced into any fiſtulous orifice that will admit a common probe; and may be eaſily paſſed along the cavity with one hand, while its point is received by the fore-finger of the other hand, thruſt into the anus, in thoſe caſes where the gut is perforated by the diſeaſe. Where it is not perforated, this inſtrument, by means of the fore-finger in its ring, can be very eaſily puſhed through it, as Mr. Pott juſtly obſerves may be done in a like ſituation with the probe-pointed knife. At this ſtage of the operation, the ſheath may be ſet at liberty in a moment by an aſſiſtant; after making a ſingle turn of the ſcrew, he may inſtantly, by its handle, withdraw the ſheath from the knife. The ſurgeon directly afterwards finiſhes the operation by dividing the gut, as with the probe-pointed knife.

" With this inſtrument (made within the laſt two months by Mr. Evans, in a very neat manner) I have performed the opera-

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* This inſtrument may likewiſe be made perfectly ſtraight. In this form it will anſwer extremely well, where the gut is to be ſlit not much above the ſphincter; but where this is to be done nearly to the extent of the fore-finger, as will be neceſſary in ſome caſes, a ſtraight line will, without great care, be apt to cut the operator's finger. It may alſo be made of any degree of curvature, or with a handle, of any ſhape or ſize, inſtead of the ring.

tion much to my ſatisfaction in five different ſubjects; the laſt of whom declares, that the whole operation gave him much leſs pain than the previous examination of the ſinus by the probe.

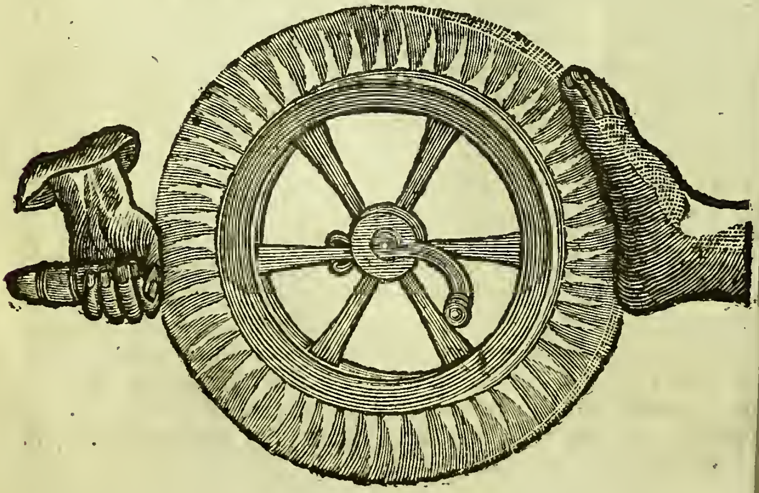
3. *For drawing teeth*]—When ſpeaking of diſeaſes of the teeth, we took occaſion to deſcribe an inſtrument for drawing teeth recommended by Dr. Dyce. The following is an account given in the Medical and Phyſical Journal, of an inſtrument for the ſame purpoſe, invented by Mr. Reece, a practitioner in London. Of this, which he calls his "Odontagra" he ſpeaks in the following terms:

"The principal objects to accompliſh in this invention, are, 1ſt. To extract the tooth in as perpendicular a direction as poſſible, which is nearly effected by the curve of the claw A (Pl. VI.), being more than a ſemicircle. 2dly. To prevent the breaking of the tooth, and facilitate its extraction, the end of the claw B is a little reflected, that it may be introduced between the ſcarified gum and tooth, as far down as the alveolar proceſs will admit of, and preſs on a greater portion of the tooth. 3dly. To avoid the great pain and injury of the gums from preſſure by the ſtructure of the fulcrum C [which rotates on either ſide, on the ſhank (G)]. In the upper part, is a concavity to receive the tooth oppoſite the upper part of the reflected end of the claw, and the preſſure of the gum portion E does not fall on the contiguous ſoft parts till the tooth is a little elevated, which afterwards, for its complete expulſion, is very trifling. 4thly. To prevent the claw ſlipping in the operation, by the ſpring F, and which, on taking firm hold of the tooth, ſo as to be withdrawn, is fixed between the fulcrum and claw, rendering a further uſe of the ſcarificator and forceps unneceſſary, which ſo often alarm the patient with the idea of a ſecond operation.

"When the caries of a tooth has gone to that extent, as to leave only a bare ſhell on one ſide, or the whole corona is deſtroyed, ſo that the remains are level with the gum, the poliſhed part of the fulcrum muſt of courſe reſt on the gum; but from the abſorption of the alveolar proceſs, and the looſe connection of the fangs with the ſocket from the ſame proceſs, the force required for their expulſion is attended with neither pain nor miſchief; and from the formation of the end of the claw, performed with greater eaſe than the uſual way of *punching*.

"It is, I think, much to be lamented, that the operation of tooth-drawing ſhould be deemed by the Faculty of ſo little importance, as to be left to the practice of people both ignorant of its nature and ſtructure of the parts, notwithſtanding the frequent occurrence of ill effects from the rude and unſcientific removal of teeth; beſides, I conceive it often a nice queſtion in ſurgery, to determine whether the extraction of the tooth be abſolutely neceſſary. A caſe ſome time ſince occurred in Monmouthſhire, of a lady who fell a ſacrifice to inflammation ariſing from the irritation of a tooth. Soon after ſhe found it painful, ſhe ſent for a ſurgeon to extract it, which, on account of the contiguous ſoft parts being much inflamed, he poſtponed till the next morning, recommending in the interim, proper means to be taken for its reſolution. In the courſe of the night this unfortunately increaſed, and on the following morning rendered the operation ſtill more objectionable. On the third morning, the inflammation had extended to the œſophagus and neck, ſo as to prevent deglutition; and on the 5th, it had ſpread to the breaſts, which were amazingly tumefied. About the 9th, a very extenſive ſuppuration took place. About the 11th, it aſſumed a gangrenous appearance, which ſoon terminated in mortification, in ſpite of the efforts of her medical attendants, who are very deſervedly eſteemed gentlemen of great profeſſional judgment and ſkill."

4. The *metallic bruſh.*]—Mr. Molwitz, of Stutgart, deſcribes a new inſtrument, which he calls the Metallic Bruſh, and from which, full as good effects may be expected as from Perkins's metallic tractors. He is however of opinion, that the action of both inſtruments is merely mechanical, but he particularly recommends his Metallic Bruſh, as uniting all the different effects of mechanical ſtimuli, as that of friction, preſſure, flagellation, bruſhing, &c. This inſtrument conſiſts of a ſmall wheel, about one foot in diameter, made of any light wood, which has on its right a handle for turning it, and on its left a wooden handle for the left hand, at which it moves through the medium of an iron axle. On its periphery, which is about one inch and a half broad, are faſtened bunches of wire, two or three inches long, the tops of which end in ſmall knobs, like the heads of pins. Nothing material conſiſts in the ſize of the knobs, or the length of the wire, nor in the direction of the bunches.



This cheap and ſimple inſtrument may be applied either by the patient himſelf in ſome places, or by ſomebody elſe, without requiring any particular dexterity, and it is ſaid to afford the following advantages. 1. During the operation the inſtrument as well as the part on which it is applied can be moved in different directions, and each place touched in ſuch a manner as anſwers the purpoſe. 2. According to ſome obſervations, the application of it on the ſurface of the belly, ſeems to promote the periſtaltic motion, and to excite the ſtomach and bowels to digeſtion, and extraction of the chyle, and likewiſe to carry off wind, and forward the excretion of fæces. 3. The inſenſible perſpiration is greatly promoted by it, and on that account its application on the whole ſurface of the ſkin may prove very uſeful in diſeaſes that ariſe from a ſuppreſſed tranſpiration. Mr. Molwitz knew an inſtance of a retrograde eryſipelas being re-produced on the ſkin by the uſe of the Metallic Bruſh. He alſo relates another caſe, where an aged man, who ſuffered ſeverely by rheumatic pains on ſeveral parts of the body, was cured by four applications of that inſtrument. As the patient was ſo extremely ſenſible at the affected places, it could at the firſt time be only applied in circular motions round the affected parts; but the ſecond time he could bear the immediate touch of the inſtrument on the ſuffering parts. 4. This operation ſeems to have a conſiderable influence on animal heat, and the circulation of the blood, as it cauſes a quicker pulſe, and a congeſtion from the whole ſyſtem of blood veſſels towards the parts that are touched with it. 5. The abſorption is thereby conſiderably ſupported and increaſed. Mr. Molwitz relates an inſtance of a conſiderable extravaſation of blood, occaſioned by a fall, being removed by it in a very ſhort time, without the application of any other remedy. 6. Mr. Molwitz thinks, that it might likewiſe be of great uſe in obſtructions and ſpaſms of the belly, cauſed by a ſedentary life; and he mentions a caſe of a painful ſpaſmodic ſenſation in the ſtomach of a woman being cured by it, when the patient could not bear any internal medicine. The operation ought to begin gently, and the inſtrument firſt conducted round the affected part, approaching by degrees towards it; and laſtly, it is not to be applied too long upon the ſame part.

EXPLANATION OF THE PLATES.

PLATE. I.

Fig. 1. A lancet and canula for diſcharging the contents of an abſceſs by means of a ſeton.

Fig. 2. A director for guiding the knife in diſcharging the contents of an abſceſs, &c.

Fig. 3. A pair of forceps for extracting polypi.

Fig. 4. A ſlit probe for conducting a ligature to the root of a polypus.

Fig. 5. A ring probe for aſſiſting in ſecuring a ligature upon the root of a polypus.

Fig. 6. A double canula for fixing a ligature upon the root of a polypus.

Fig. 7. A bandage for making compreſſion after performing the operation of arteriotomy at the temples.

Fig. 8. A ſeton needle.

Fig. 9. *a*, *b*, Two pins of different forms uſed in the twiſted or hare-lip ſuture. The firſt commonly made of ſilver, with a moveable ſteel point; the other of gold.

Fig. 10. The tourniquet now moſt generally uſed.

Fig. 11. The tenaculum uſed in drawing out the mouths of bleeding veſſels, for the purpoſe of ſecuring them by ligature.

Fig. 12. A blunt-pointed biſtoury.

Fig. 13. A raſpatory for removing the pericranium in the operation of the trepan.

Fig. 14. The trephine, with all its parts connected and ready for uſe. *a*, the centre-pin, which can be raiſed or depreſſed by the ſlider *b*. *c*, the part where the ſaw is united to the handle by means of the ſpring *d*.

Fig. 15. A bruſh for cleaning the teeth of the ſaw.

Fig. 16. Forceps for removing the piece of bone when nearly cut through by the trephine or the trepan.

Fig 17. A levator alſo employed in removing the piece of bone.

Fig. 18. A lenticular for ſmoothing the ragged edge of the perforated bone.

Fig. 19. A ſpeculum uſed for keeping the eye-lids ſeparated, and the eye fixed, in performing various operations upon that organ.

Fig. 20. A flat curved hook for elevating the upper eye-lid, and fixing the eye, in performing various minute operations upon its ſurface.

Fig. 21. A couching needle.

Fig. 22. A couching needle for the right eye, fitted for the operator's right hand.

Fig. 23. A knife for extracting the cataract.

Fig. 24. A flat probe for ſcratching the capſule in extracting the cryſtalline lens.

Fig. 25. A flat probe or ſcoop for aſſiſting in removing the cataract.

Fig. 26. A knife for extracting the cataract from the right eye.

Fig. 27. One of Anel's probes for removing obſtructions of the lachrymal duct.

Fig. 28. A ſyringe and pipe (by the ſame) for injecting a liquid into the lachrymal duct.

Fig. 29. A crooked pipe which fits the ſyringe.

PLATE II.

Fig. 30. An inſtrument for compreſſing the lachrymal ſac.

Fig. 31. A trocar and canula for perforating the os unguis in the operation for the fiſtula lachrymalis.

Fig. 32, 33, 34. Inſtruments employed by Mr. Pellier in the operation for fiſtula lachrymalis. Fig. 32, a conductor for clearing the naſal duct. Fig. 33, a conical tube to be left in the duct. Fig. 34, a compreſſor for fixing the tube in its place.

Fig. 35. A trocar for making an artificial parotid duct.

Fig. 36. Forceps ſometimes uſed for laying hold of the lip in the operation for the hare-lip.

Fig. 37. Pins uſed in the operation for hare-lip, repreſented as they are uſually inſerted into the part.

Fig. 38. A gum lancet.

Fig. 39. A trocar for perforating the antrum maxillare.

Fig. 40. An inſtrument of a tubular form for the ſame purpoſe.

Fig. 41. No. 1, 2, 3, 4, 5. 1, a file for removing inequalities upon the teeth. 2, 3, 4, 5, different forms of inſtruments for removing tartar, &c. from the teeth.

Fig. 42. No. 1, 2, 3. 1, 2, inſtruments for ſtuffing gold-leaf, &c. into a hollow tooth. 3, the handle which fits them all.

Fig. 43. Forceps for extracting teeth.

Fig. 44. A punch or lever for extracting ſtumps of teeth.

Fig 45. Mr. Cheſelden's needle, with an eye near the point, for tying a knot on ſcirrhous tonſils.

Fig. 46. A ſpeculum oris firſt propoſed by Mr. B Bell.

Fig. 47. A ſcarificator for ſcarifying the amygdalæ, and for opening abſceſſes in the throat.

Fig. 48. Forceps for extracting extraneous ſubſtances from the outer paſſage of the ear.

Fig. 49. An inſtrument uſed for concentrating ſound in caſes of deafneſs.
Fig. 50. A tube by which the Euſtachian tube may be waſhed in certain caſes of deafneſs.
Fig. 51. An inſtrument for perforating the lobes of the ear.
Fig. 52. An inſtrument recommended by Mr. B. Bell for ſupporting the head after the operation for wry-neck.
Fig. 53. An inſtrument, invented by Dr. Monro, for fixing the canula after the operation of bronchotomy.
Fig. 54. A ſyringe for injecting the outer paſſage of the ear.
Fig. 55. A ſilver canula for carrying off pus collected in the thorax.
Fig. 56. Mr. André's lancet-pointed trocar, the canula of which is made of two hollow plates of ſteel ſcrewed together at the larger extremity.
Fig. 57. A director uſed in the operation for the ſtrangulated hernia.
Fig. 58. A ſpring truſs for an inguinal or femoral hernia of one ſide only.
Fig. 59. A ſpring truſs for an inguinal or femoral hernia exiſting on both ſides.
Fig. 60. A ſpring truſs for an umbilical hernia.
Fig. 61. Mr. André's trocar for evacuating the contents of an encyſted hydrocele.
Fig. 62. Mr. B. Bell's trocar for operating in the hydrocele.
Fig. 63. A bag of *reſina elaſtica*, with a ſtop-cock and ſhort pipe, which fits the canula of the trocars fig. 77, 78, for the purpoſe of injecting the cavity of the tunica vaginalis in the caſe of hydrocele.

PLATE III.

Fig. 64. A ſtraight-edged biſtoury, ſharp-pointed.
Fig. 65. A ſound uſed in ſearching for the ſtone.
Fig. 66. A grooved ſtaff for the operation of lithotomy.
Fig. 67. A cutting gorget.
Fig. 68. A double gorget invented by Dr. Monro.
Fig. 69. Extracting forceps.
Fig. 70. A ſcoop.
Fig. 71. A grooved ſtaff for the operation of lithotomy as it is performed in females.
Fig. 72. A tube containing a pair of elaſtic forceps for extracting ſtones from the urethra.
Fig. 73. A jugum penis uſed in caſes of incontinence of urine in men. See p. 343.
Fig. 74. Peſſaries for ſupporting the uterus in caſes of prolapſus uteri in females; uſually made of box-wood or cork.

Fig. 75. A catheter for a male.
Fig. 76. A catheter for a female.
Fig. 77. Mr. Hunter's cauſtic conductor.
Fig. 78. A biſtoury uſed in the operation for phymoſis.
Fig. 79. A ſilver canula for conducting the urine after amputation of the penis.
Fig. 80. A biſtoury, with a probe of flexible ſilver joined to it, to be uſed in the operation of fiſtula in ano.
Fig. 81. A biſtoury, which has been lately uſed by ſome practitioners in the operation for the fiſtula in ano.
Fig. 82. A wire of ſilver or lead, with a tube of the ſame metal, for laying open a fiſtula in ano.
Fig. 83. A bandage for ſupporting the end of the rectum in caſes of prolapſus ani.
Fig. 84. Mr. Park's leather-caſe for ſupporting the fore-arm after luxations of the joints or fractures of the clavicle, or bones of the ſuperior extremities. See p. 456.
Fig. 85. Repreſents a fractured limb dreſſed with an eighteen-tailed bandage, and placed in the manner recommended by Mr. Pott.

PLATE IV.

Fig. 86. Mr. Gooch's machine, improved by Dr. Aitken, for keeping a fractured thigh-bone properly extended. The upper circular bandage goes round the waiſt, the under one fixes immediately above the knee. See p. 470.
Fig. 87. A bandage for a fractured patella.
Fig. 88. A leather ſplint for a fractured leg.
Fig. 89. Mr. James's machine, which is an improvement upon one invented ſome years ago by Mr. White of Mancheſter, for retaining fractured thighs, or bones of the leg, in their natural ſituation.
Fig. 90. The common collar uſed in diſtortions of the ſpine.
Fig. 91. Stays recommended by Mr. Jones for diſtortions of the ſpine. See p. 517.
Fig. 92. An apparatus for a diſtortion of the leg.
Fig. 93. An apparatus for a diſtorted leg, where the ſole is turned much out of its natural direction.
Fig. 94. Shoes which have been uſed with advantage in particular caſes of club-feet.
Fig. 95. An amputating knife.
Fig. 96. A retractor of cloth or leather, uſed in amputating the larger extremities.
Fig. 97. Iron retractors recommended by Dr. Monro in amputation of the larger extremities.
Fig. 98. The amputating ſaw now moſt generally uſed.

Fig. 99. Pincers for nipping off any points of bone which may remain after the ſaw has been uſed.

Fig. 100. A catline uſed in an amputation of the leg.

Fig. 101. An inſtrument invented by Mr. Moore, of London, for compreſſing the nerves, and thereby diminiſhing pain in performing various operations upon the extremities. See chap. xxxv.

Fig. 102. An apparatus invented by the late Dr. Monro for the cure of a rupture of the tendo Achillis.

Fig. 103. A pair of ſpring forceps, for laying hold of the extremities of arteries, &c.

PLATE V.

Mr. Ware's ſtillettes for the fiſtula lachrymalis.
Dr. Mudge's ſpeculum ani.
Mr. Smith's air-pump vapour-bath.
New-invented hemiſpherical acouſtic tubes for deaf perſons.
Dr. Brown's fumigator for the teeth.
Mr Sheldrake's inſtruments for the diſtorted ſpine.
Volta's *Galvanic Pile*, with an apparatus for medical purpoſes.

PLATE VI.

Dr. Dyce's improved tooth-inſtruments.
Mr. Reece's Odontagra.
Implements for the recovery of drowned perſons.

PLATE VII.

M. Deſſault's biſtoire caché for lithotomy.
Mr. Watt's new inſtrument for the ſame.
Mr. Whately's biſtoury for the fiſtula in ano.

PL. 1.

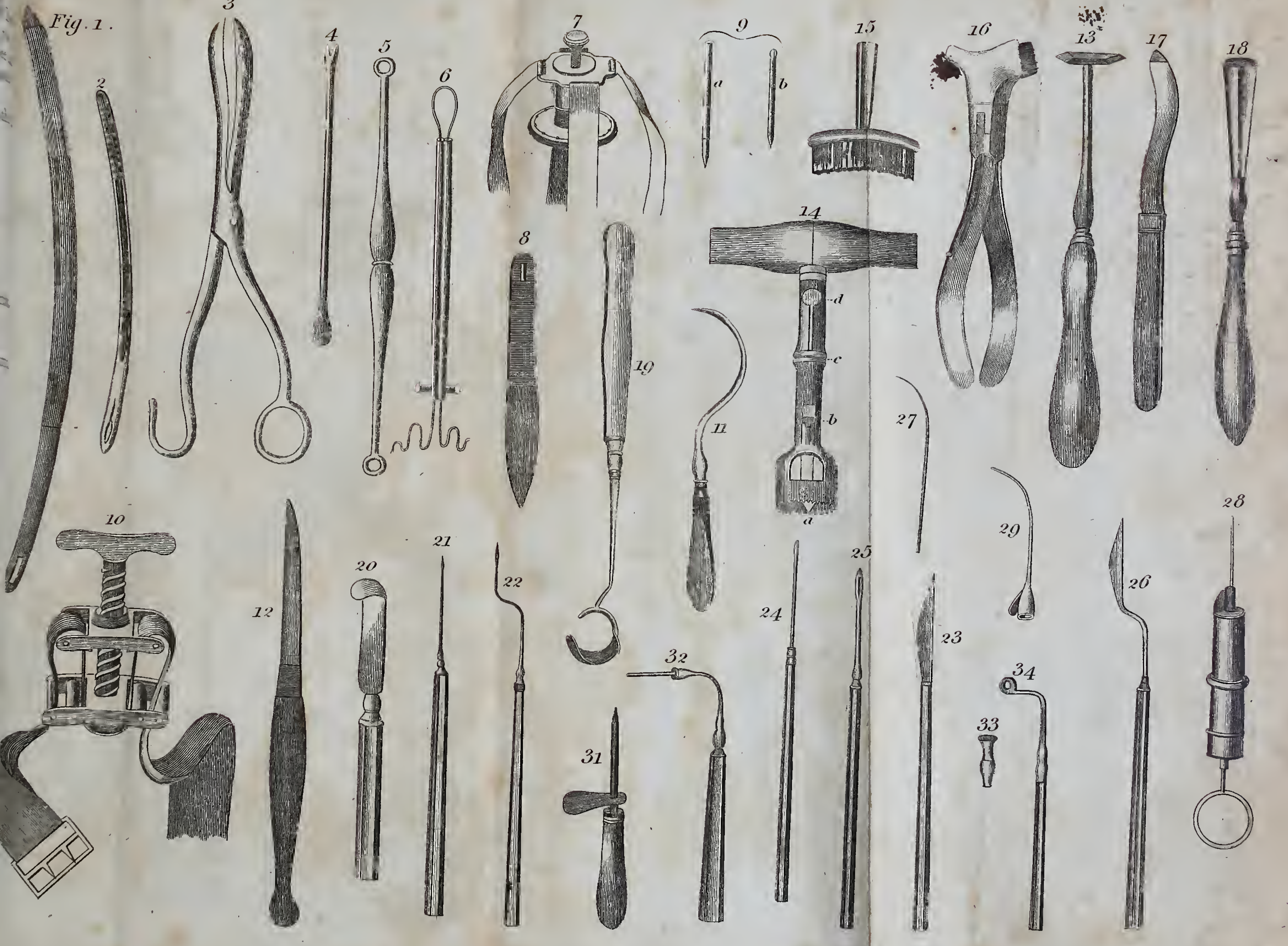


Fig. 1.
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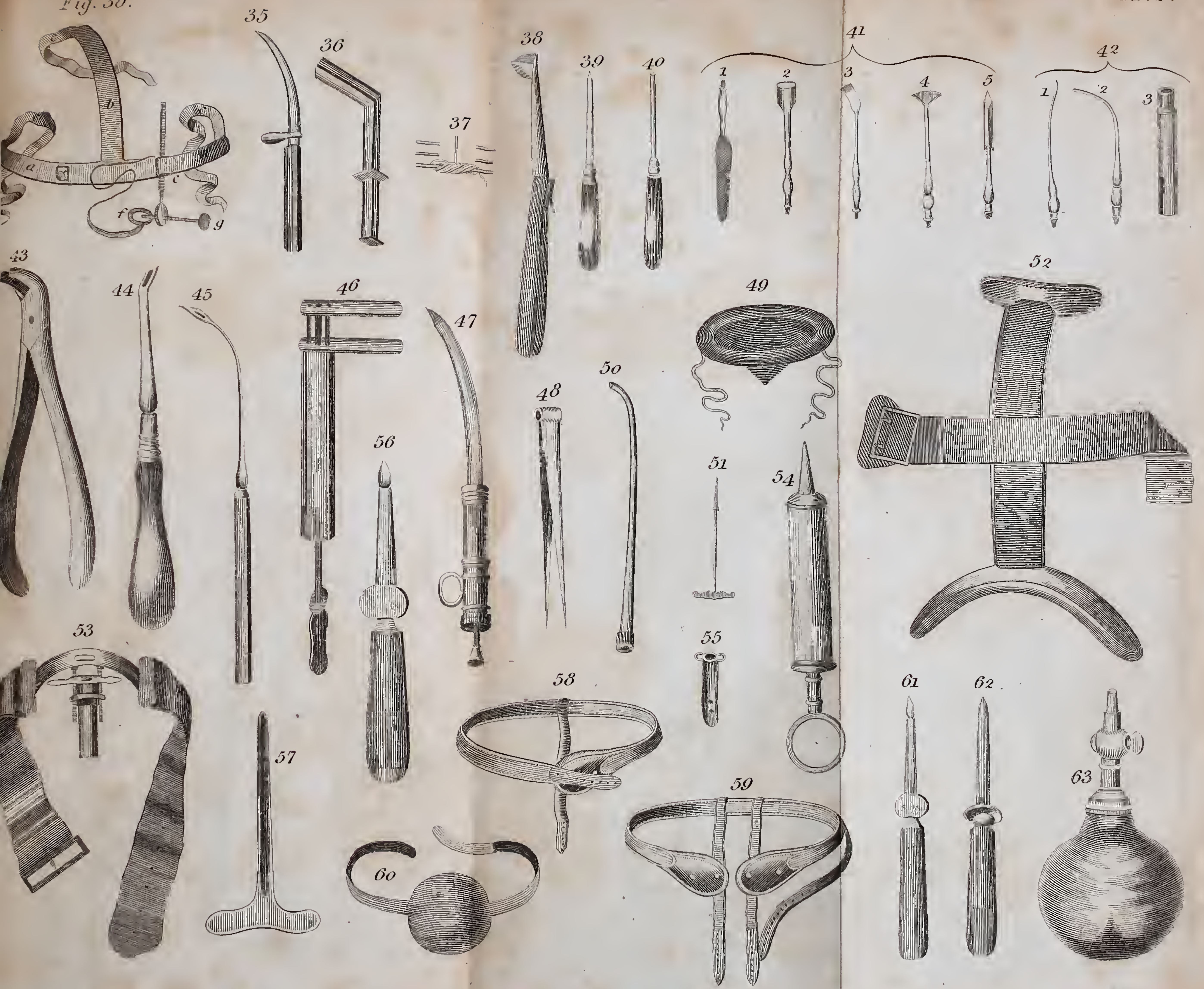
PL. 2.



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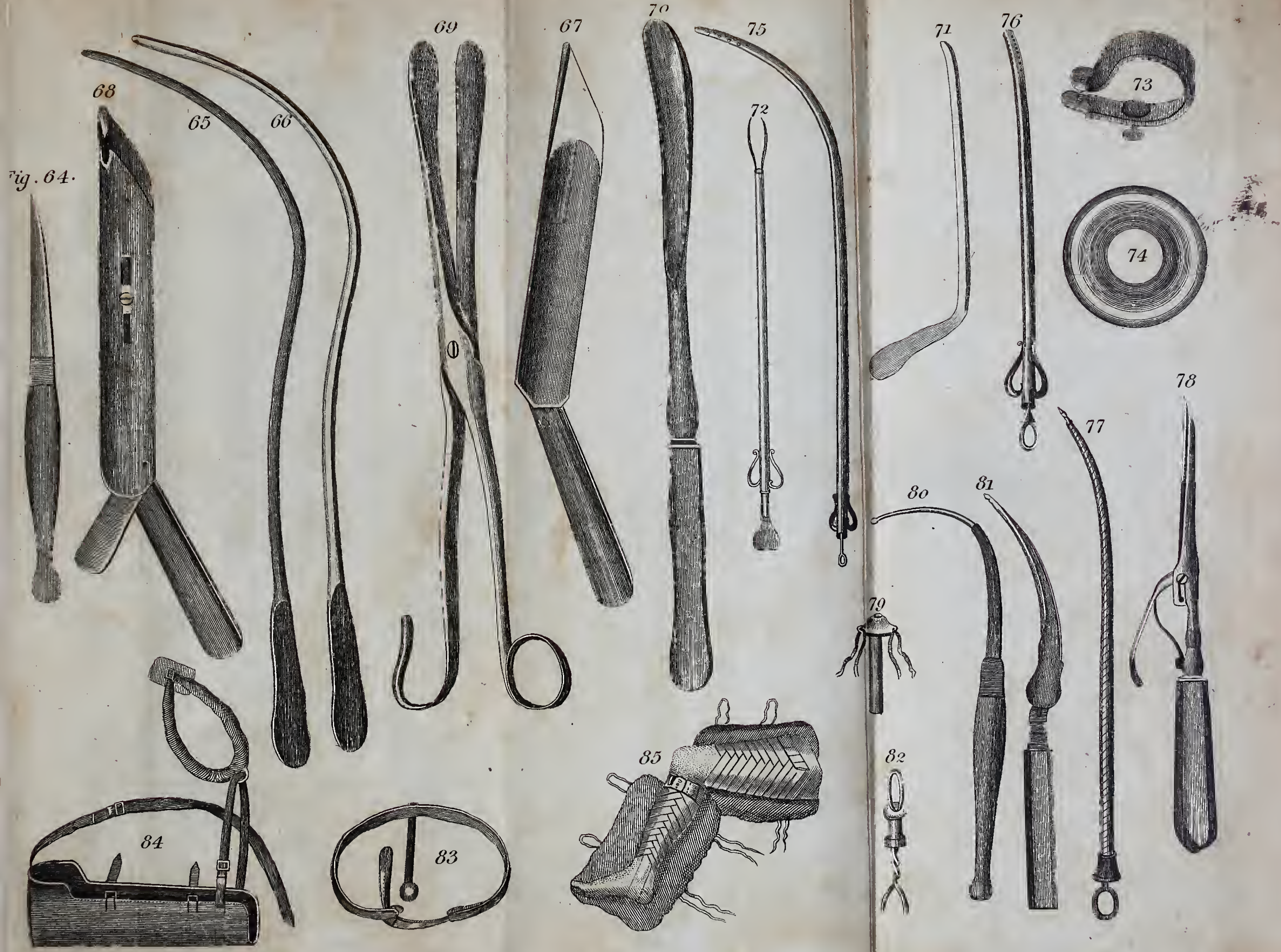


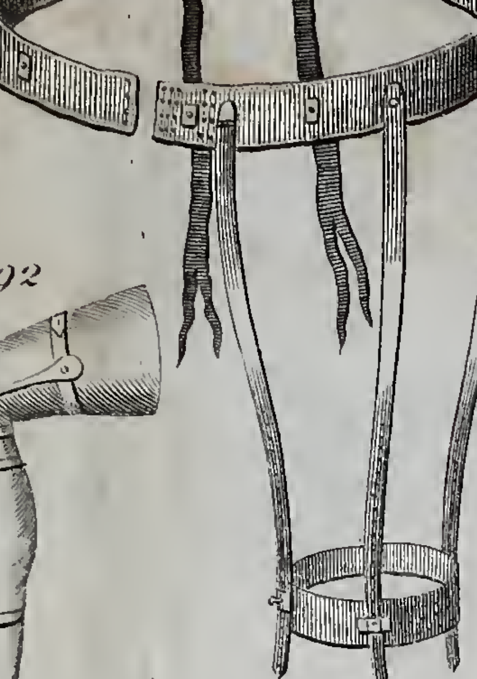
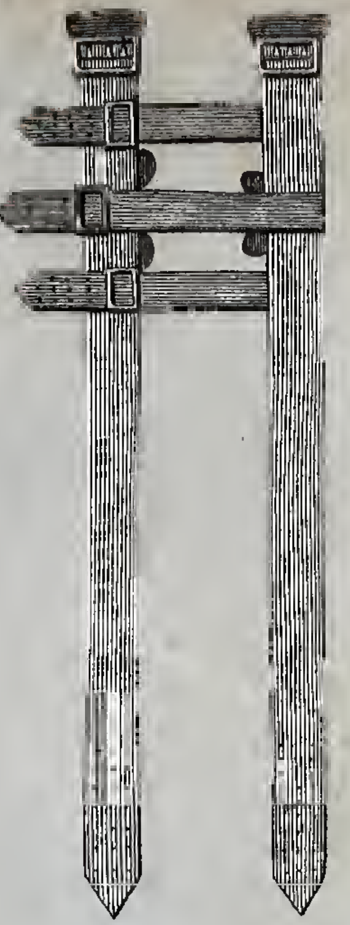


Fig. 86.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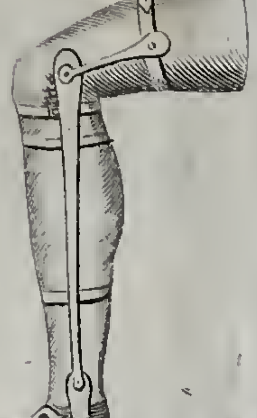
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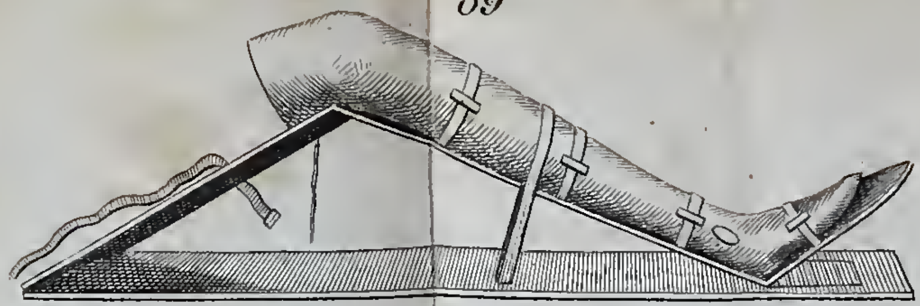
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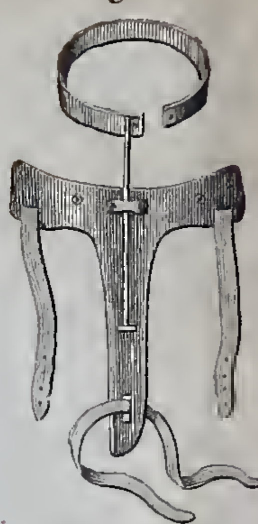
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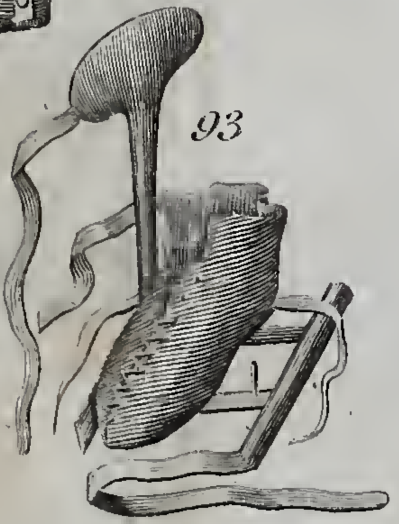
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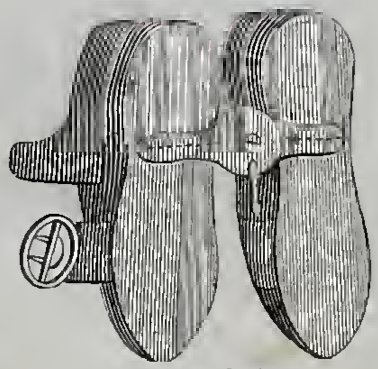
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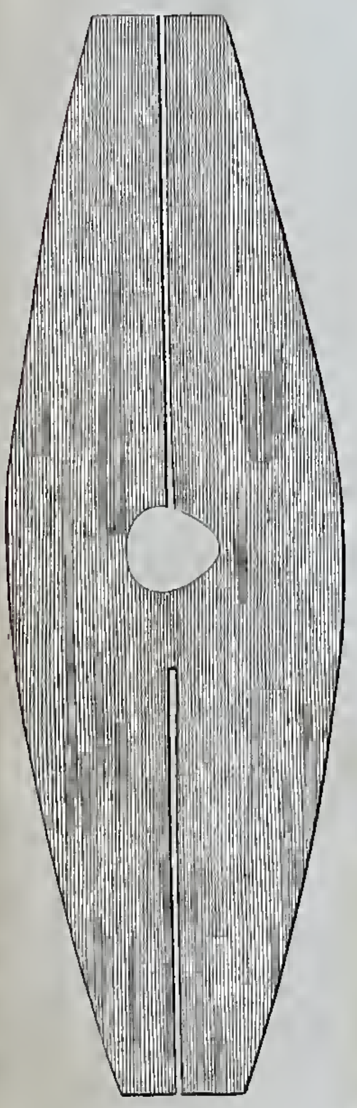
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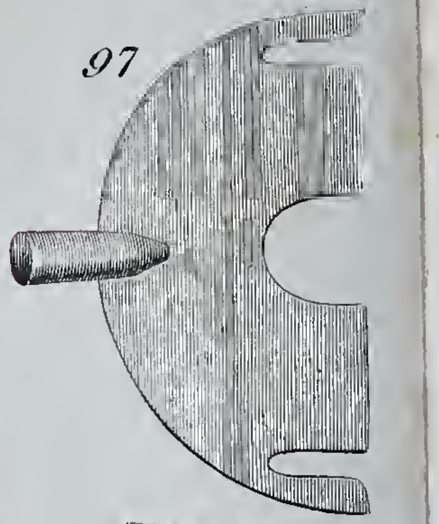
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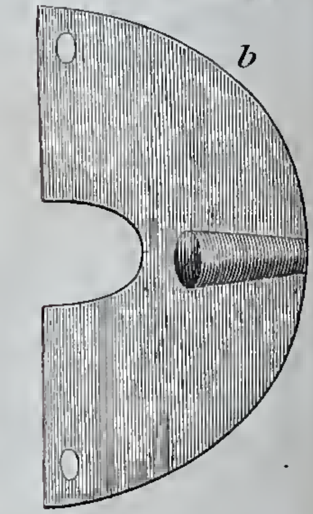
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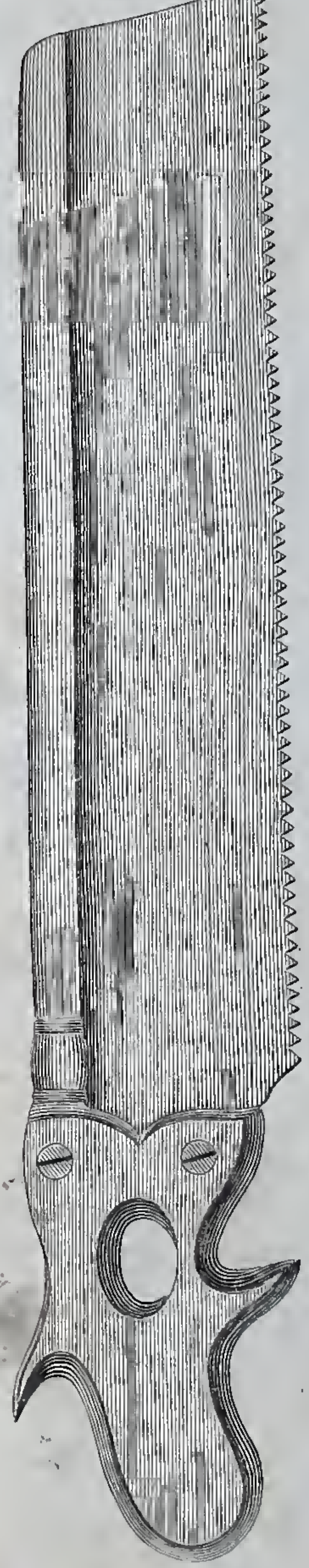
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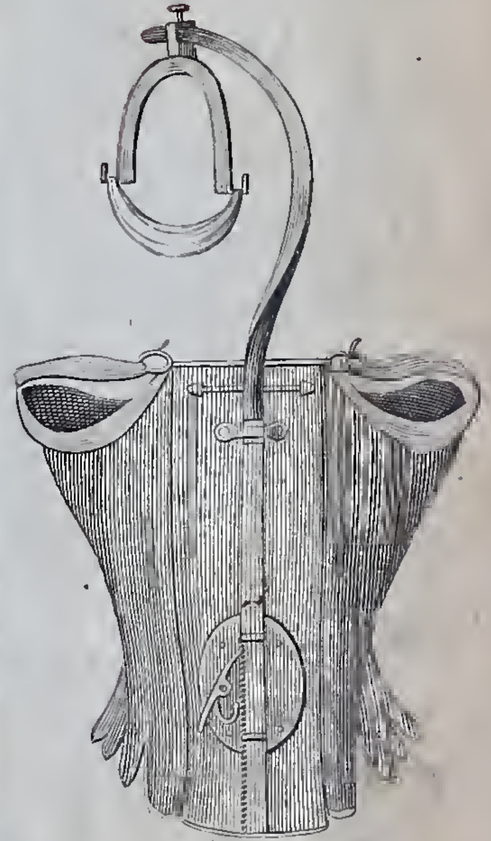
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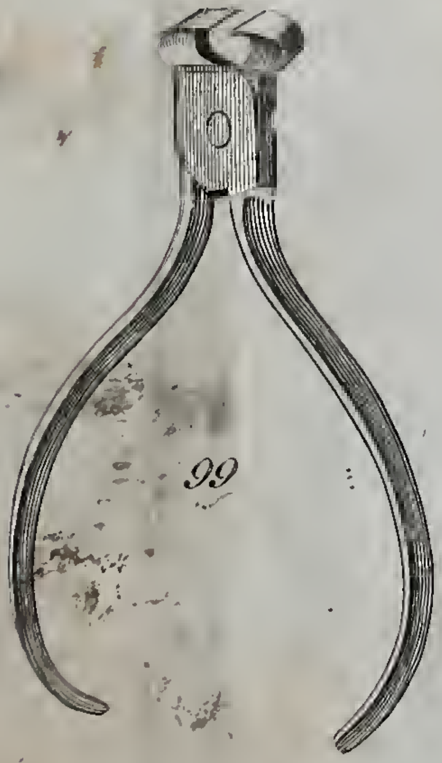
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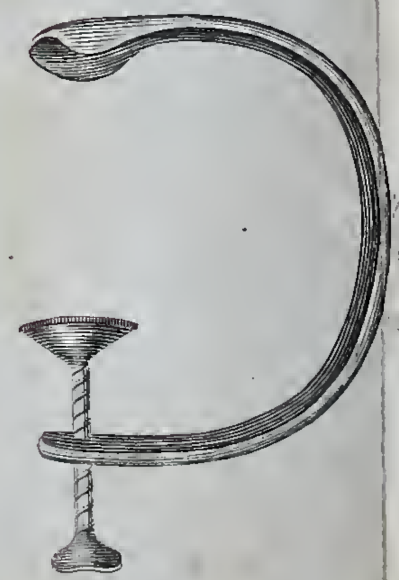
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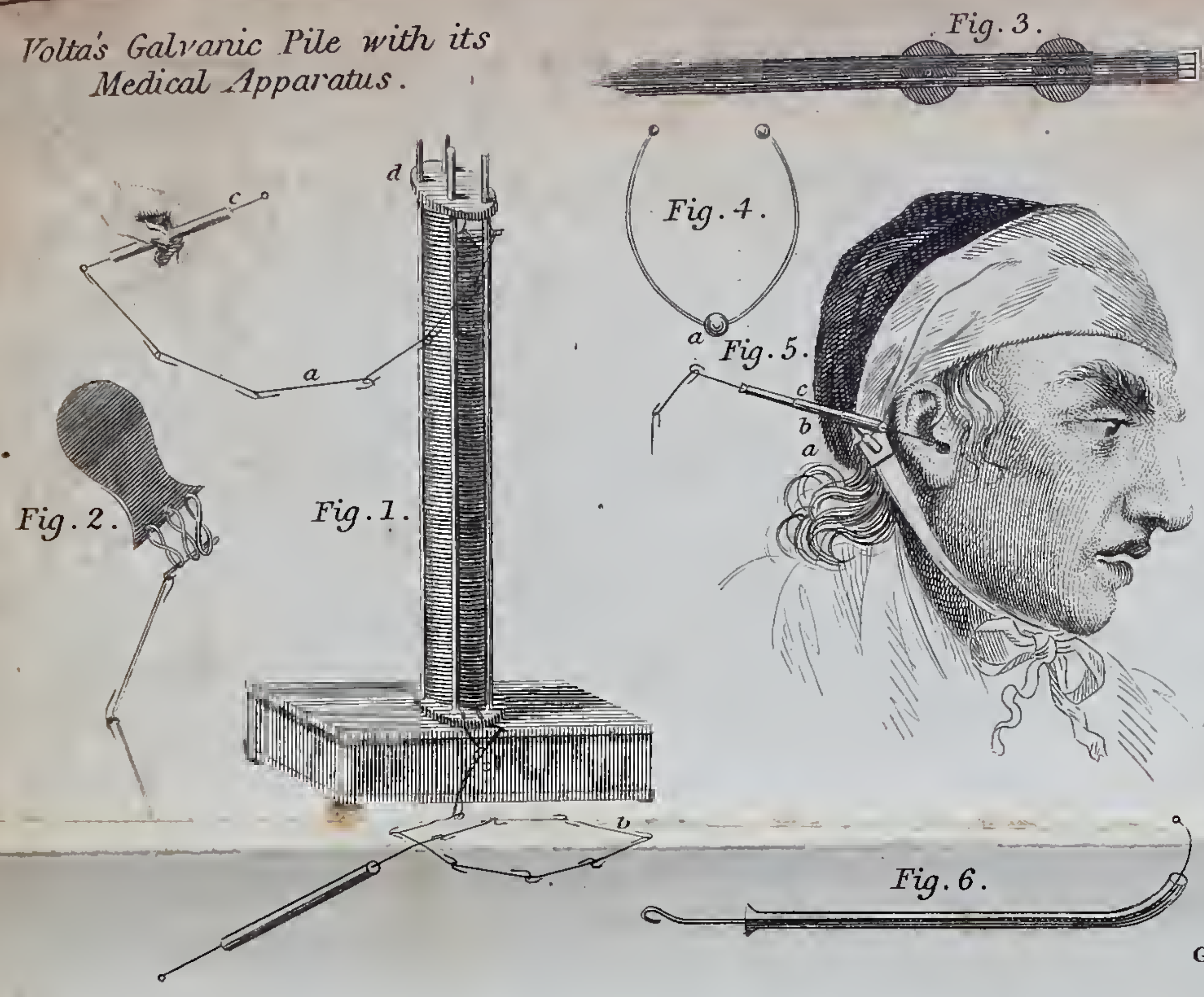
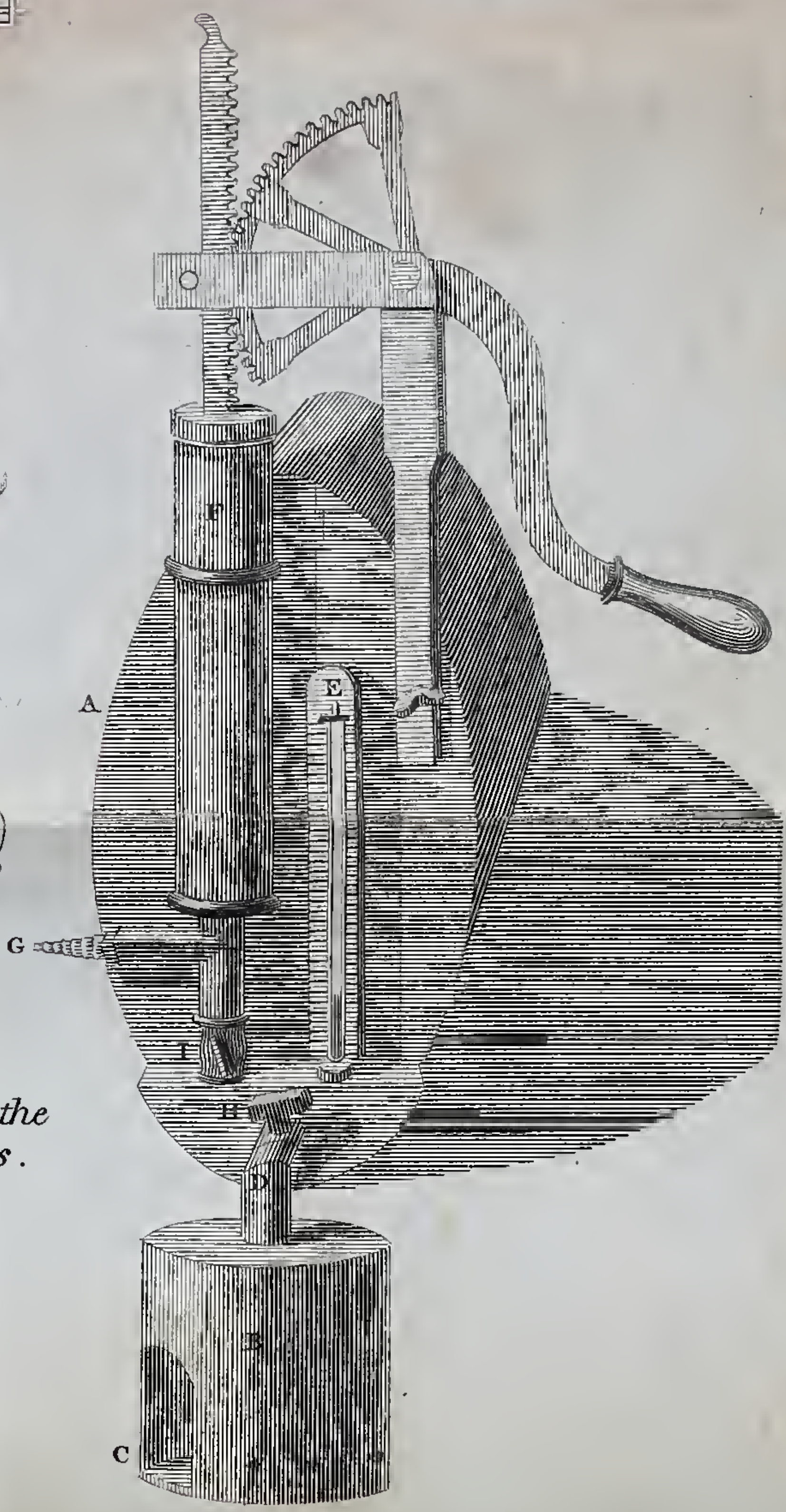
Volta's Galvanic Pile with its Medical Apparatus.



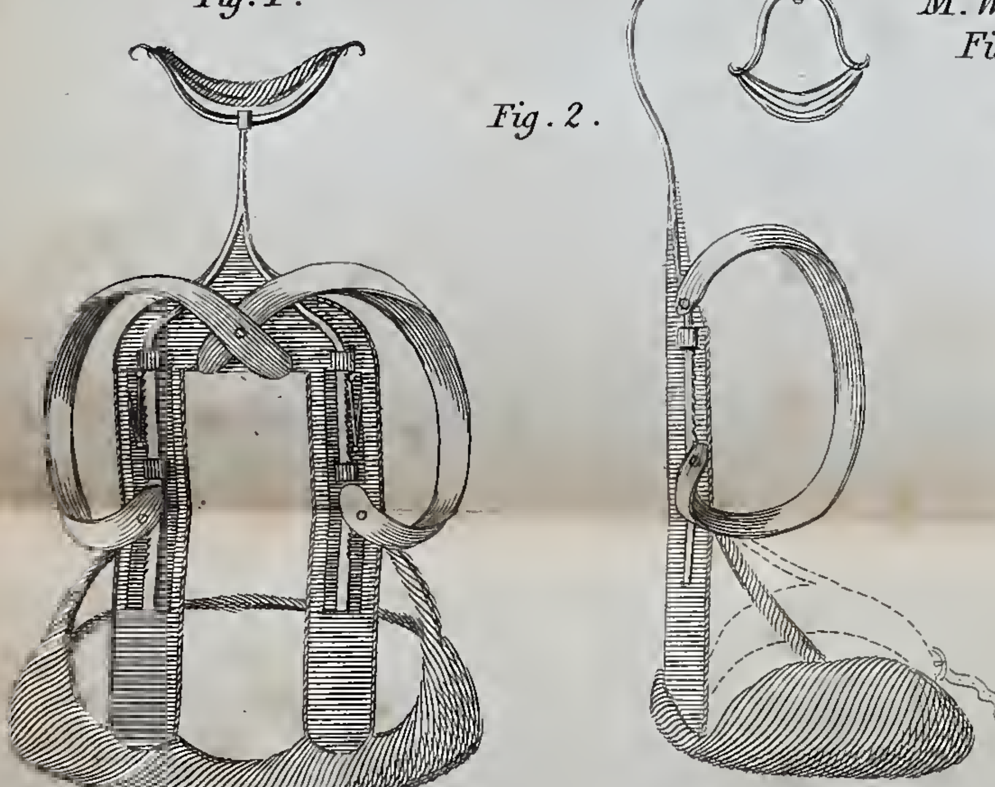
Smith's Air-Pump Vapour Bath.



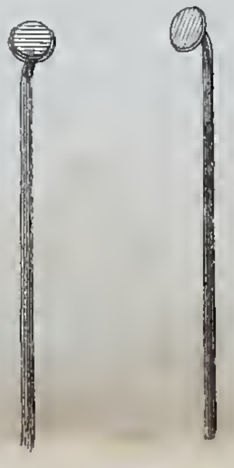
Mr. Sheldrake's Instruments for the Distorted Spine.

Fig. 1.

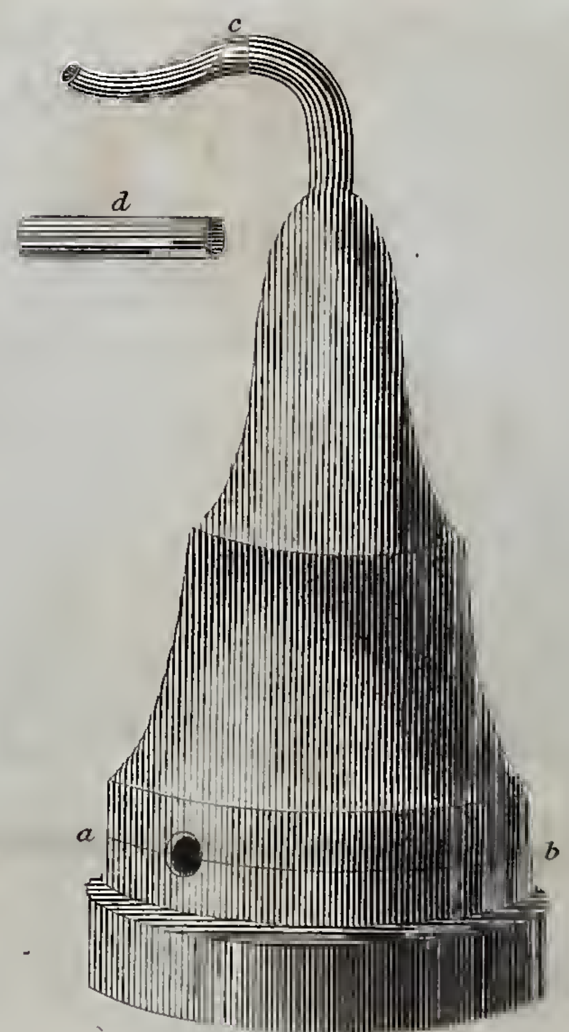
Fig. 2.



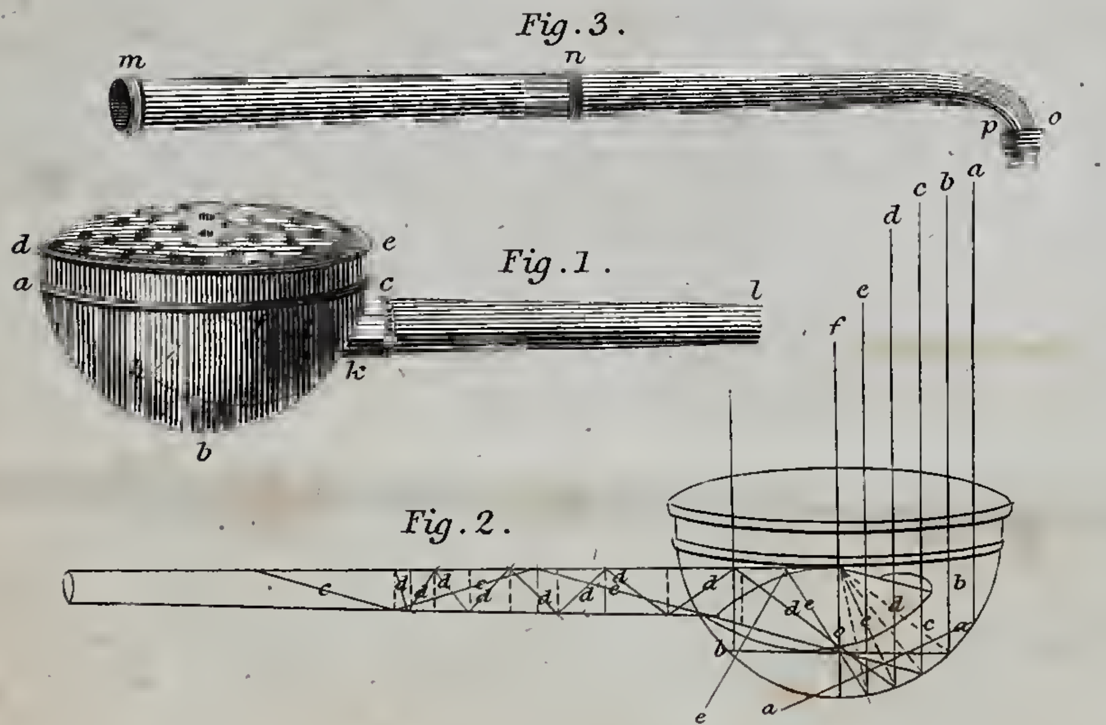
Mr. Ware's Stilette for the Fistula Lachrymalis.



Dr. Brown's Fumigator for the Teeth.



Hemispherical acoustic Tube.



Mutlow Sc. Ruſsell Cot.

Dr. Dyce's Improved Tooth Instruments.

Fig. 1.

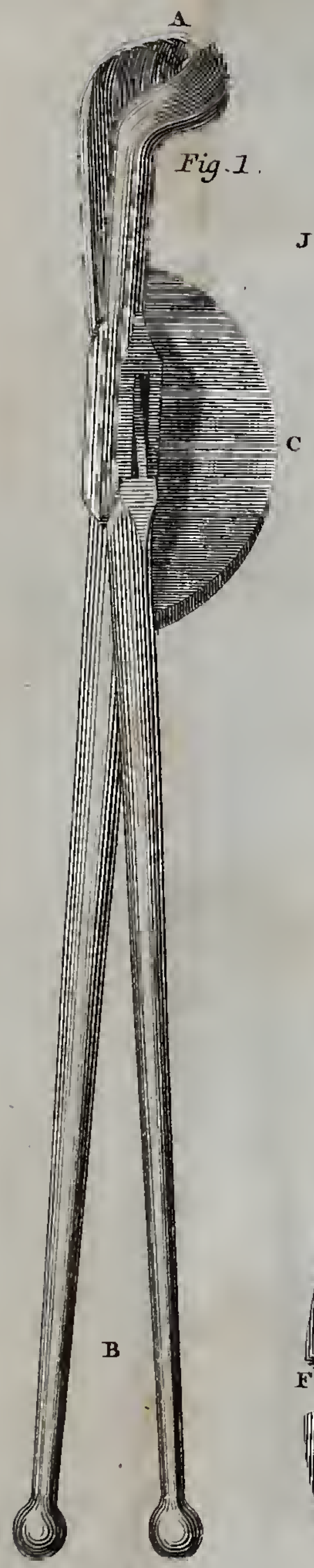
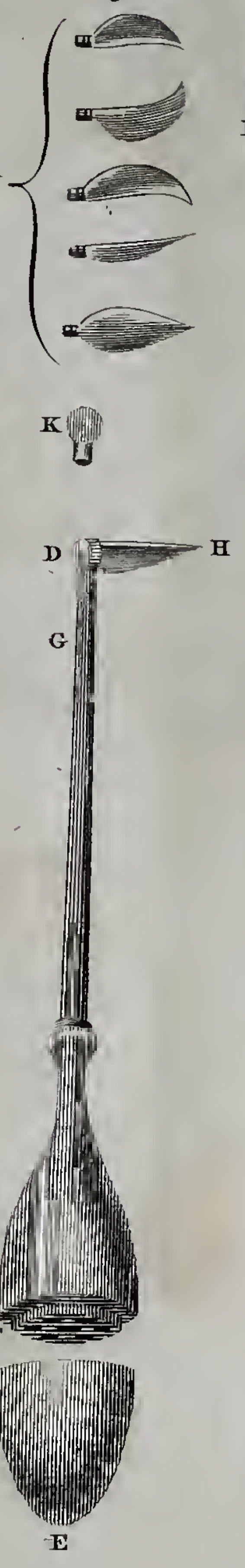
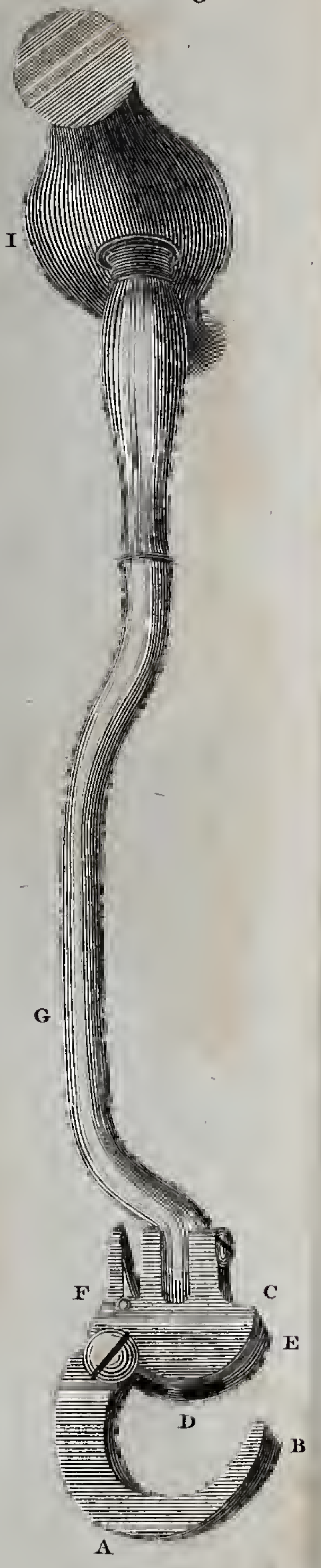


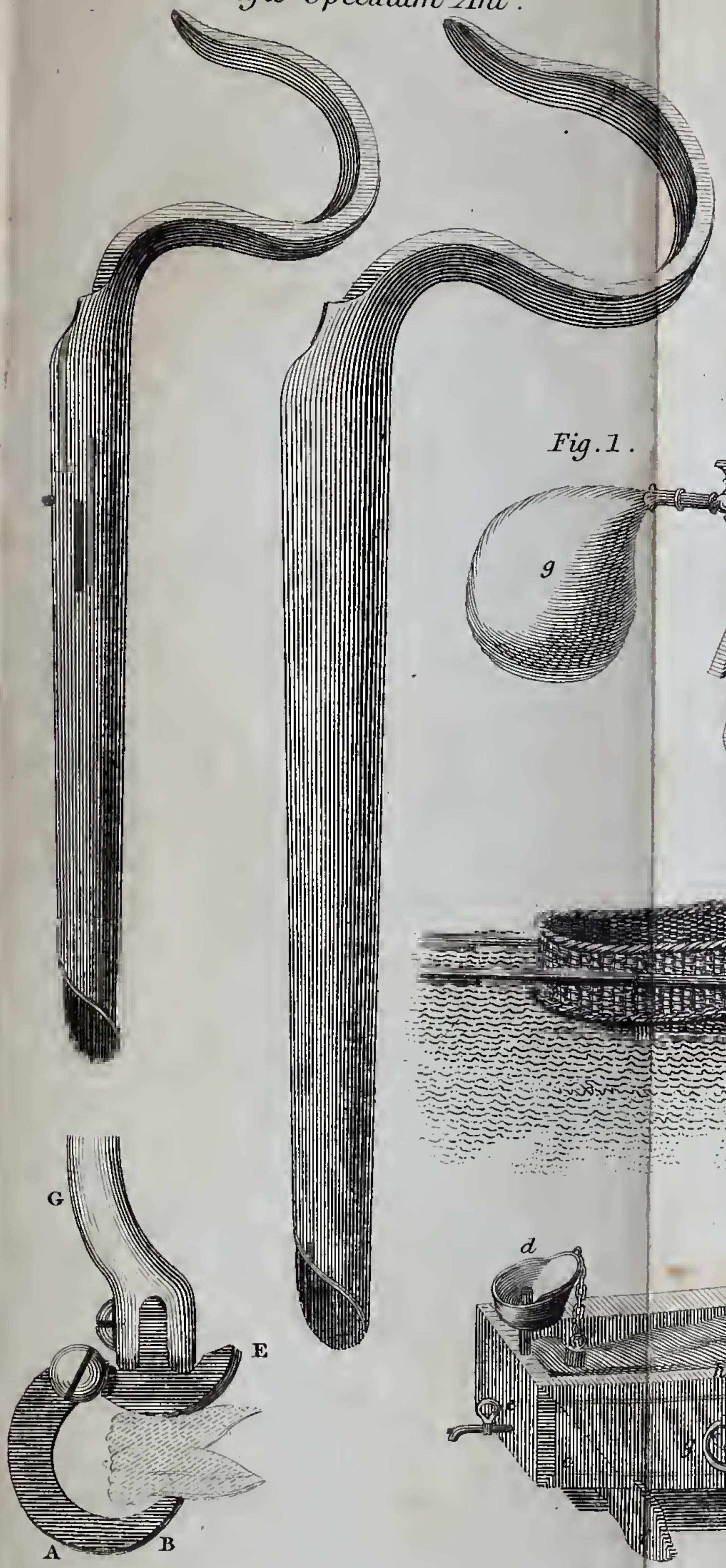
Fig. 2.



Mr. Reece's Odontagra.



Mudge's Speculum Ani.



Implements of Restoration from Drowning.

Fig. 1. Fig. 2.

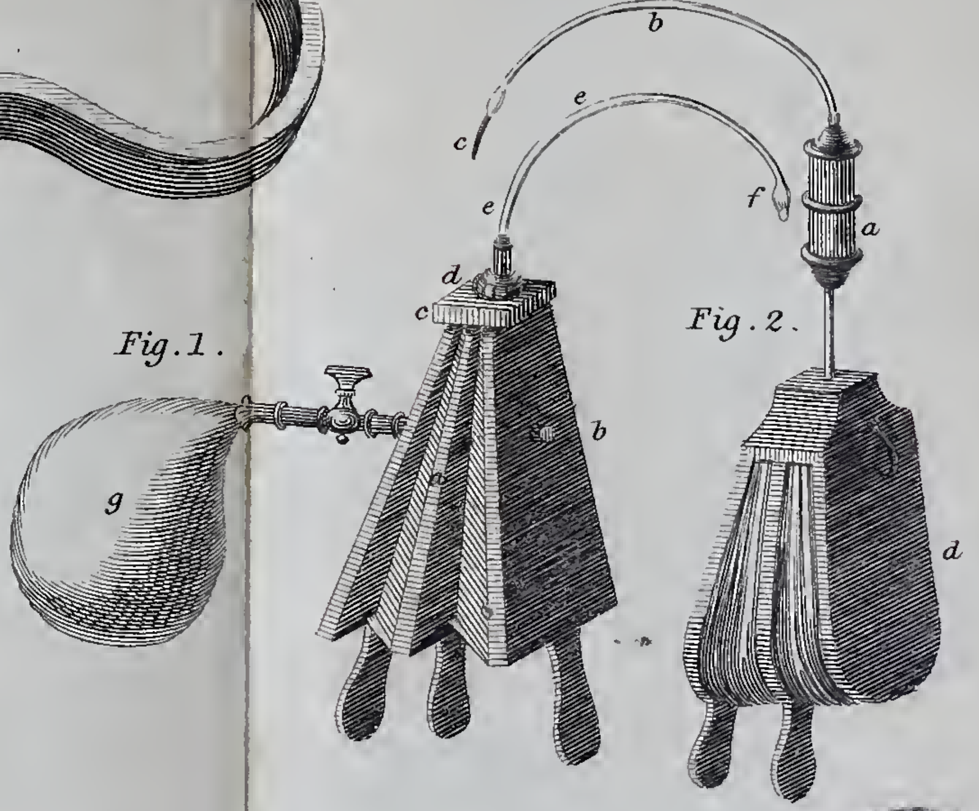


Fig. 3.

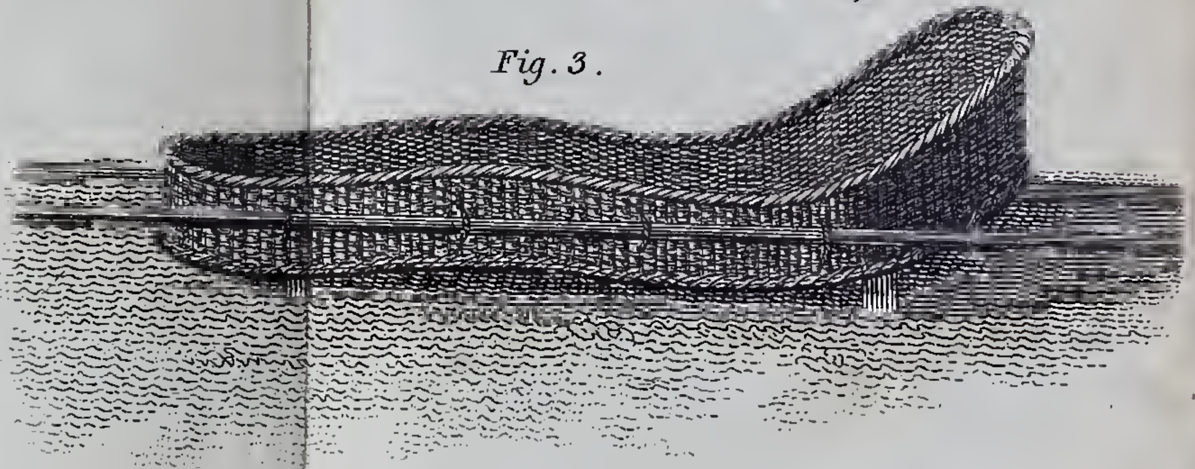
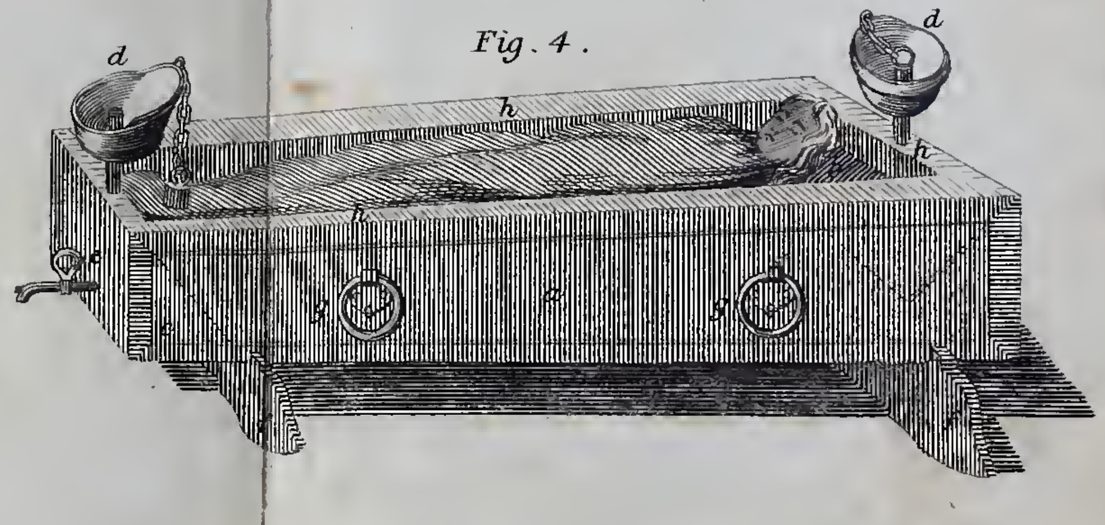


Fig. 4.



Mutlow Sc. Russell Ct.

For Lithotomy M. Deſsault's Bistoire caché.

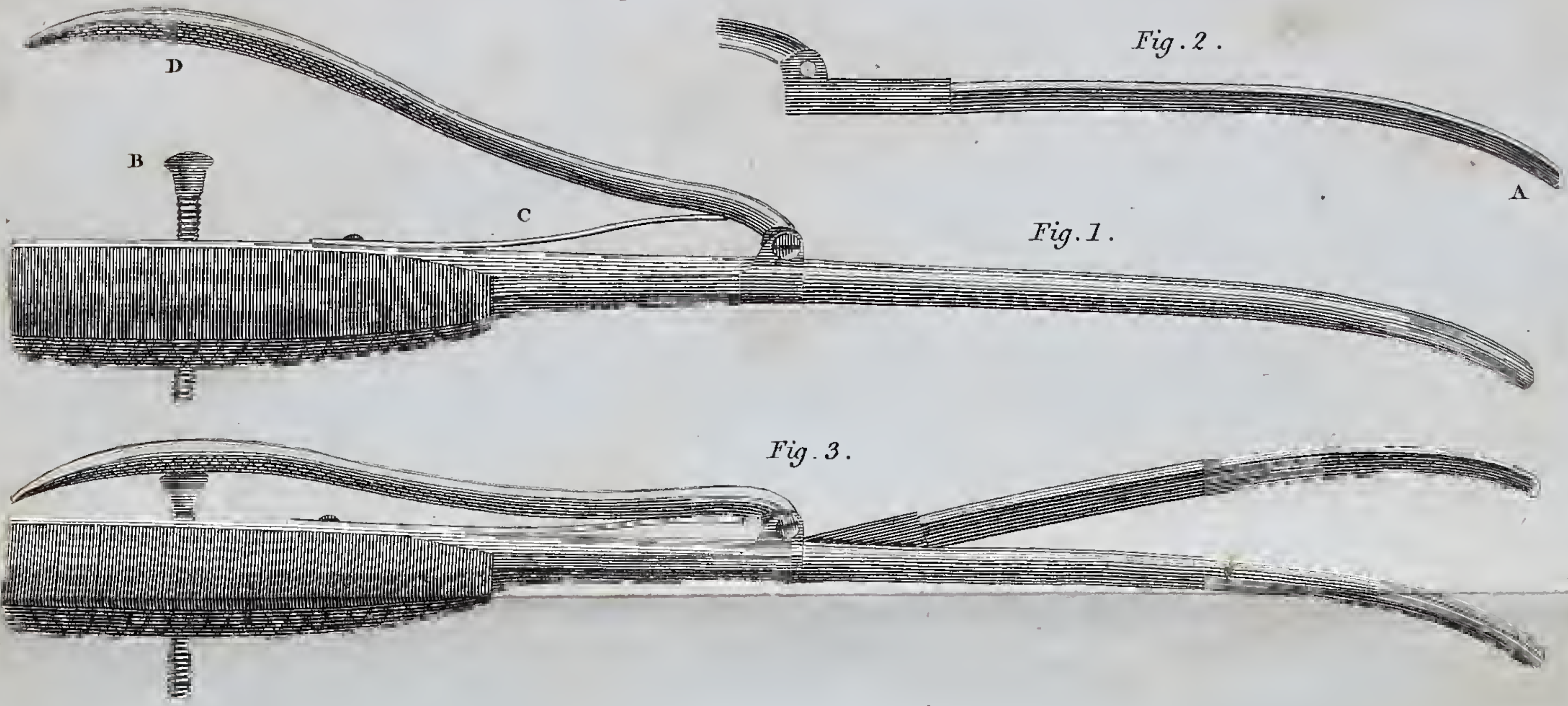


Fig. 2.

Fig. 1.

Fig. 3.

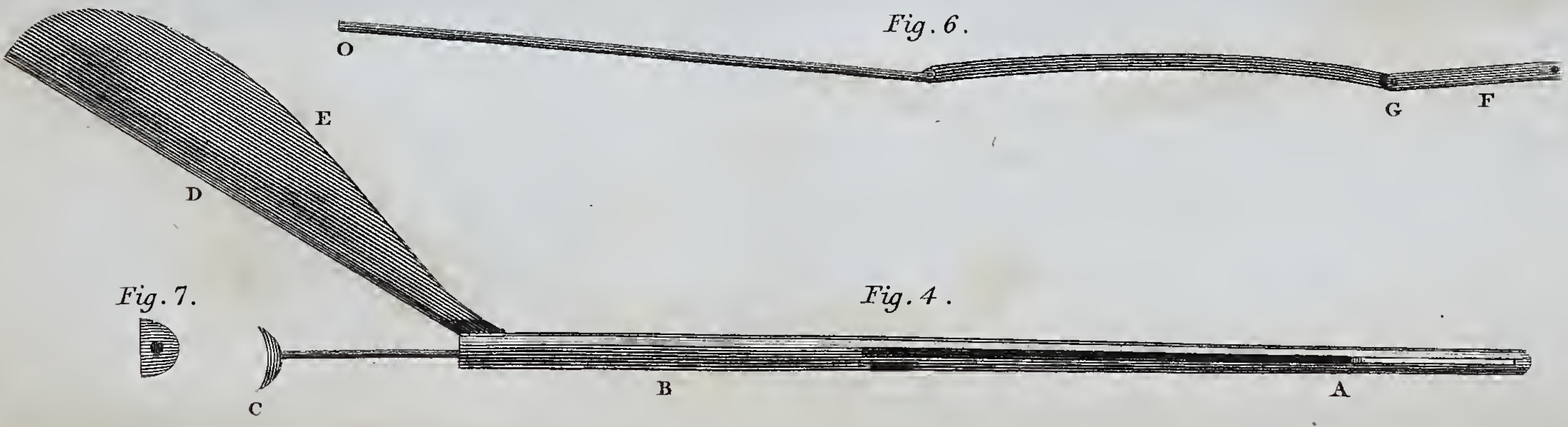


Fig. 6.

Fig. 7.

Fig. 4.

M.r Watt's New Instrument.

Fig. 5.

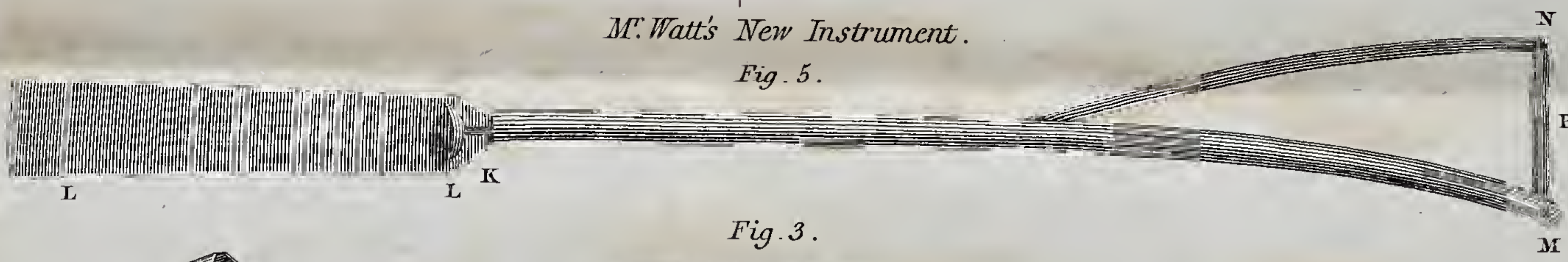


Fig. 3.

M.r Whateley's Bistoury for the Fistula in Ano.

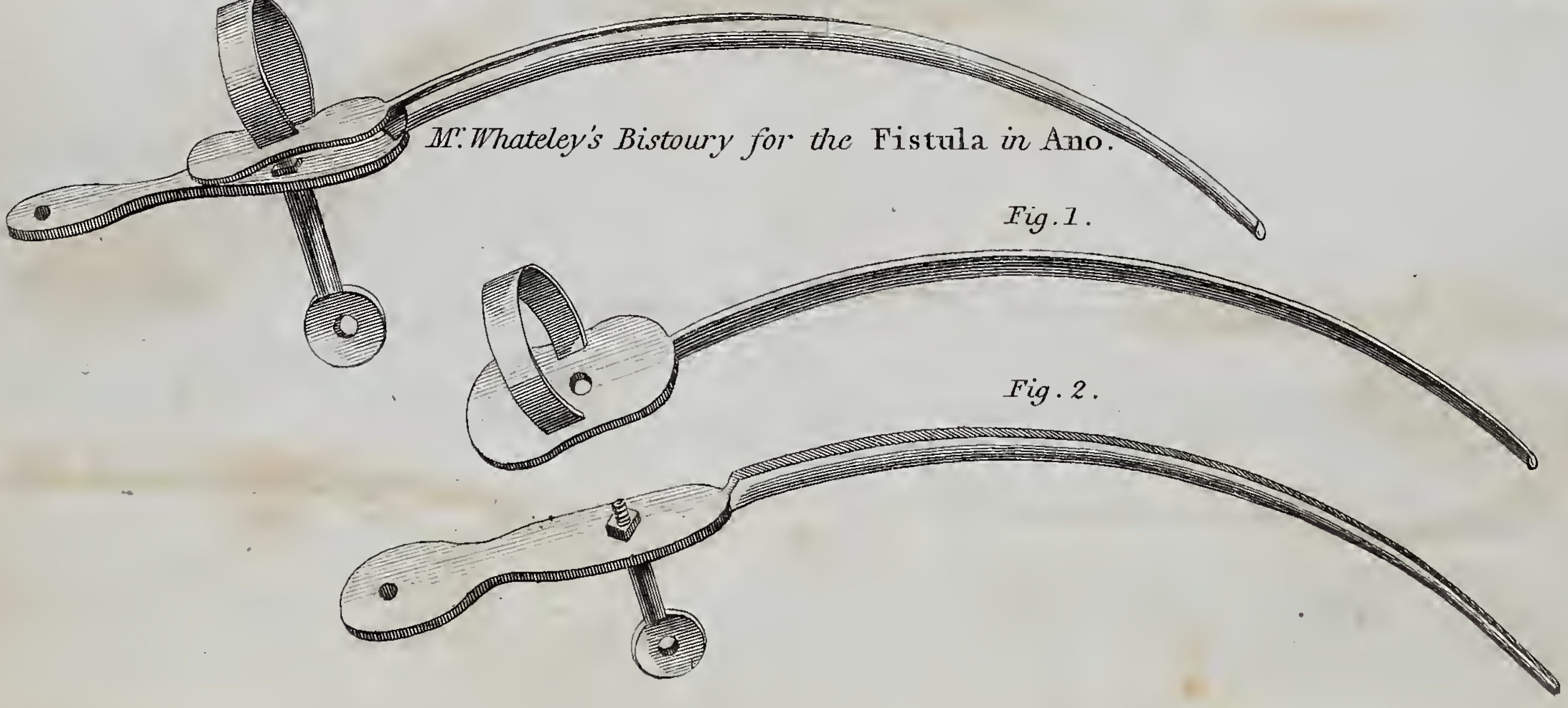


Fig. 1.

Fig. 2.

Mutlow Sc. Ruſsell C.t.

TABULA exhibens diverſa ex HYDRARGYRO PRÆPARATA et COMPOSITA, hactenus cognita †.

I. HYDRARGYRUM SIMPLICITER PURIFICATUM.

* Hydrargyrum purificatum.
Angl. *Quickſilver, crude purified mercury.* Germ. *Reines queckſilber.* Gal. *Mercure pure.*
Syn. Mercurius crudus purificatus *officinarum.*
Argentum vivum purificatum.

II. PRÆPARATA IN QUIBUS HYDRARGYRUM SOLUMMODO DIVISUM ESSE VIDETUR.

1. Decoctum Hydrargyri, i. e. Hydrargyrum ſimpliciter in aqua coctum.

2. Extracto Glycyrrhizæ ſubactum.

3. Gummi aut mucilagine, e. g. Gummi Arabico, Tragacanthæ, &c.
* Hydrargyrum gummoſum.
Syn. Mercurius gummoſus, inventore *Plenck.*

COMPOSITA.
* α Pilulæ ex hydrargyro gummoſo.
Syn. Pilulæ ex mercurio gummoſo. *Plenck. Pharm. Chir.*
β Solutio mercurialis gummoſa. *Ibid.*
Syn. Mixtura mercurialis. *G.*
γ Potio mercurialis. *B.*
δ Lac mercuriale. *Plenck.*

4. Reſina aut Balſamo; e. g. Terebinthina, Balſamo Copaivæ, &c.
* Hydrargyrum terebinthinatum, &c.

---

† Literæ, quibus præparata et compoſita notantur, ſignificant: O. Officinarum; L. Pharmacopœia Londinenſis; S. Pharm. Suecica; D. Pharm. Danica; E. Pharm. Edinburgenſis; B. Diſpenſatorium novum Brunſwicenſe; E. *paup.* Pharm. Edinburgenſis Pauperum; T. Pharm. Noſocomii Sti. Thomæ Londinenſis; G. Pharm. Noſocomii Sti. Georgii Lond. * Lewis Diſp.

Composita.

* Pilulæ ex hydrargyro terebinthinato.
Pilulæ mercuriales. *L.*
Pilulæ mercuriales laxantes. *G.*
Pilulæ mercuriales ſialagogæ. *D.*
Injectio mercurialis. *E. Paup.*

5. Pinguedine animali aut oleis unguinoſis; e. g. Axungia porcina, anſerina; butyro Cacao.
* Hydrargyrum unguinoſum.
* Unguentum hydrargyri.
Syn. Unguentum ex hydrargyro cœruleum. *E.*
Unguentum mercuriale, ſeu unguentum Neapolitanum.

Composita.

α Unguentum hydrargyri. *L.*
Unguentum hydrargyri mitius. *L.*
Unguentum mercuriale. *D.*
β Ceratum mercuriale. *L.*
γ Emplaſtrum mercuriale. *O.*
Emplaſtrum ex hydrargyro. *E.*
Emplaſtrum ammoniaci cum hydrargyro. *L.*
Emplaſtrum lithargyri cum hydrargyro. *L.*
Emplaſtrum de ranis cum mercurio.

6. Terra Calcarea; e. g. Creta, Lapidibus aut Chelis Cancrorum, &c.
Mercurius alkaliſatus. *E.*
Pulvis mercurialis. *G.*

III. PRÆPARATA IN QUIBUS HYDRARGYRUM, MEDIANTE IGNE ET LIBERO AERIS ACCESSU, IN CALCEM VERTITUR.

* Hydrargyrum calcinatum.
Syn. Mercurius calcinatus. *L. S.*
Mercurius præcipitatus per ſe. *L.*

Composita.

* Pilulæ ex hydrargyro calcinato.
Pilulæ ſyphiliticæ. *T.*
Pilulæ ex mercurio calcinato. *G.*
Pilulæ ex mercurio calcinato anodynæ. *G.*

IV. PRÆPARATA IN QUIBUS HYDRARGYRUM PARTIM DIVISUM, PARTIM SOLUTUM ESSE, VIDETUR.

1. Saccharo, Manna, Conſerva Roſarum, Cynoſbati, &c.
  * Saccharum hydrargyratum.

COMPOSITA.
  * Trochiſci ex hydrargyro ſaccharato.
    Bolus cœruleus. *T.*
    Bolus mercurialis. *G.*
    Syrupus Hydrargyri. *S.* *Phar. Chir.*
  * Mel hydrargyratum.

COMPOSITA.
    Pilulæ Æthiopicæ. *E.*
    Pilulæ mercuriales purgantes. *E. paup.*
    Pilulæ Belloſti.

3. Sulphure purificato.
  * Hydrargyrum ſulphuratum.
    a Trituratione aut fuſione.
  * Hydrargyrum ſulphuratum nigrum.
    Æthiops mineralis. *O.*

COMPOSITA.
    Pulvis Æthiopicus. *G.*

  b Sublimatione.
  * Hydrargyrum ſulphuratum rubrum.
    Cinnabaris factitia, ſeu artificialis. *O.*

COMPOSITA.
    Pulvis antilyſſus Sinenſis. *O.*

  c Præcipitatione.

4. Sulphure Antimonii.
  a Trituratione.
  * Sulphur antimonii hydrargyratum.
    Æthiops antimonialis. *O.*

COMPOSITA.
    Pilulæ Æthiopicæ. *E. D.*

  b Sublimatione.
    Sulphur antimonii hydrargyratum rubrum.
      Syn. Cinnabaris antimonii. *O.*

COMPOSITA.
    Bolus Cinnabarinus. *G.*

V. PRÆPARATA IN QUIBUS HYDRARGYRUM MEDIANTE ACIDO IN FORMAM SALIS AUT CALCIS MUTATUM EST.

1. Acido Sebi. 2. Acido Muriatico. 3. Acido Sacchari. 4. Acido Succini. 5. Acido Arſenici. 6. Acido Acetoſellæ. 7. Acido Phoſphori. 8. Acido Vitrioli. 9. Acido Sacchari Lactis. 10. Acido Tartari. 11. Acido Citri. 12. Acido Nitri. 13. Acido Fluoris mineralis. 14. Acido Aceti. 15. Acido Boracis. 16. Acido Cœrulei Berolinenſis. 17. Acido Molybdænæ. 18. Acido Tungſtenico. 19. Acido aëreo. 20. Acido phoſphorico.

I. *Hydrargyrum cum acido ſebi combinatum.*
Hydrargyrum ſebinum.
* *Præp.* Unguentum hydrargyri.

II. *Cum acido muriatico.*
* Hydrargyrum muriatum.
* *Hydrargyrum muriatum fortius.*
A. Sublimatione.
* Hydrargyrum muriatum fortius ſublimatum.
Syn. Mercurius ſublimatus corroſivus.
Mercurius ſublimatus albus. *O.*
Mercurius cum ſale ammoniaco ſublimatus.
B. Præcipitatione.
Ex acido nitri, mediante acido muriatico dephlogiſticato, inventore *Bertholet.*
Hydrargyrum muriatum fortius præcipitatum.

COMPOSITA.
α Solutio ſublimati ſpirituoſa (*Van Swieten*).
Syn. Solutio mercurii ſublimati corroſivi. *E.*
Mixtura mercurialis. *S.*
Mercurius ſublimatus ſolutus. *G.*
β * Solutio hydrargyri muriati fortioris aquoſa.
Pilulæ e mercurio corroſivo albo. *S.*
Dr. Ward's white drop.
Syrop du Cuiſinier.
γ * Lotio ſyphilitica flava, ſ. lotio ex hydrargyro muriato fortiori
Syn. Aqua phagedænica. *O.*
Liquor mercurialis. *A.*
Lotio mercurialis. *T.*
δ Solutio ſublimati balſamica. *Plenck.*
ε * Liquor ad condylomata.
Syn. Aqua cauſtica pro condylomatibus. *Plenck.*

* *Hydrargyrum muriatum mitius*; i. e. acidum muriaticum hydrargyro ſuperſaturatum.
A. Sublimatione.
Syn. Mercurius dulcis (ſublimatione paratus). *O.*
Mercurius dulcis ſublimatus. *E.*
Calomel ſeu calomelas. *L.*
Aquila alba.
Panacea mercurialis.
Mercurius dulcis lunaris. *Schroeder.*
B. Præcipitatione.
Ex acido nitroſo, mediante ſale communi, inventore *Scheele.*
* Hydrargyrum muriatum mitius præcipitatum.
Mercurius præcipitatus dulcis.
Calx hydrargyri muriata præcipitata.
a Ex acido muriatico, mediante alkali vegetabili.
Calx hydrargyri alba. *L.*
b Ex acido muriatico mediante alkali minerali.
Mercurius præcipitatus albus. *A.*
c Ex acido muriatico mediante alkali volatili.
Mercurius præcipitatus albus. *E.*
d Ex acido muriatico mediante cupro.
Mercurius præcipitatus viridis. *E.*

COMPOSITA.
Bolus mercurialis. *E.*
Bolus jalappæ cum mercurio. *Ib.*
Bolus rhei cum mercurio. *Ib.*
Pilulæ calomelanos. *G.*
Pilulæ Plummeri. *E.*
Pilulæ alterantes Plummeri. *O.*
Pilula depurans. *T.*
Pulvis Plummeri. *O.*
Pilulæ mercuriales purgantes. *A.*
Pilulæ catarrhales purgantes. *D.*
Pilulæ laxantes cum mercurio. *Ib.*
Pulvis e ſcammonio cum mercurio. *T.*
* Lotio ſyphilitica nigra, lotio ex hydrargyro muriato mitiori.
Syn. Lotio mercurialis. *G.*
Unguentum e mercurio præcipitato. *L.*
Linimentum mercuriale. *E. Paup.*

III. *Cum acido ſacchari.*
a Hydrargyrum ſaccharatum. *Bergman.*
* b Saccharum hydrargyratum, ſeu
Hydrargyrum ſaccharo cando ſubactum.

IV. *Cum acido ſuccini.*
Hydrargyrum ſuccinatum. *Bergman.*

V. *Cum acido arſenici.*
Hydrargyrum arſenicatum. *Bergman.*

VI. *Cum acido oxalis acetoſellæ.*
Hydrargyrum oxalinum. *Bergman.*

VII. *Cum acido phoſphorico.*
Hydrargyrum phoſphoratum. *Bergman.*
Præcipitatione ex acido nitroſo mediante urina recenti.
Roſa mineralis. *O.*

VIII. *Cum acido vitriolico.*
* a Hydrargyrum vitriolatum.
Vitriolum mercurii. *O.*
Oleum mercurii. *O.*
b Hydrargyrum vitriolatum flavum.
Turpethum minerale. *O.*
Hydrargyrus vitriolatus. *L.*
Mercurius flavus. *E.*
Mercurius præcipitatus luteus. *D.*
Turpethum nigrum: *O.*
c Hydrargyrum præcipitatum ex acido nitroſo mediante hepate ſulphuris aut calcis.
Mercurius præcipitatus niger. *O.*

IX. *Cum acido ſacchari lactis.*

X. *Cum acido tartari.*
a Hydrargyrum tartariſatum. *Bergman.*
* b Tartarus hydrargyratus; i. e. hydrargyratum cum tartaro purificato unitum. *Terre feuilletée mercurielle*, inventore *Preſſavin.*
c Præcipitatione ex acido nitroſo mediante acido tartari.
* Hydrargyrum tartariſatum flavum; vulgo, *Pulvis Conſtantinus.*
d Præcipitatione ex acido muriatico et acido tartari junctis mediante alkali vegetabili.
* Hydrargyrum tartariſatum album; vulgo, *Pulvis argenteus.*

XI. *Cum acido citri.*
Hydrargyrum citratum. *Bergman.*

XII. *Cum acido nitroſo.*
* Hydrargyrum nitratum.

a Calcinatum mediante igne.
* Hydrargyrum nitratum rubrum.
  Mercurius corroſivus ruber. *L. E.*
  Mercurius præcipitatus ruber.
  Pulvis principis. *O.*
  Mercurius corallinus. *L.*
  Mercurius tricolor. *O.*
  Panacea mercurii. *O.*
  Arcanum corallinum.
  Panacea mercurii rubra. *O.*

COMPOSITA.
  Balſamus mercurialis. *Plenck.*
  Unguentum ophthalmicum. *St. Ives.*
  Balſamum ophthalmicum rubrum. *D.*
  Unguentum præcipitatum. *G.*
  Unguentum ad lippitudinem. *T.*
  Unguentum mercuriale rubrum. *D.*
  Unguentum pomatum rubrum. *D.*
* b Acidum nitri hydrargyratum; i. e. hydrargyrum in acido nitroſo ſolutum.
  Solutio mercurii. *E.*

COMPOSITA.
  Unguentum citrinum. *E. S.*
* c Præcipitatione.
  Ex acido nitri mediante alkali volatili.
  α Hydrargyrum nitratum cinereum.
    Pulvis mercurii cinereus. *E.*
    Turpethum album. *O.*
  β Ex acido nitroſo mediante alkali volatili vinoſo (ſpiritu ſalis ammoniaci vinoſo).
    Turpethum nigrum.
    Mercurius præcipitatus niger.
  γ Ex acido nitroſo mediante alkali vegetabili.
    Mercurius præcipitatus fuſcus, inventore *Wurtz.*
  δ Ex acido nitroſo mediante cupro.
    Mercurius præcipitatus viridis. *B.*

XIII. *Cum acido fluoris mineralis.*
  Hydrargyrum fluoratum. *Bergman.*

XIV. *Cum acido aceti.*
  * Hydrargyrum acetatum. *Bergman.*

COMPOSITA.
  Trochiſci, *S.* pilulæ *Keyſeri.*

XV. *Cum acido boracis.*
Hydrargyrum boraxatum. *Bergman.*

XVI. *Cum acido cœrulei Berolinenſis.*

XVII. *Cum acido molybdænæ.*

XVIII. *Cum acido tungſtenico.*

XIX. *Cum acido aëreo.*
Hydrargyrum aëratum. *Bergman.*

XX. *Cum acido phoſphorico.*

END OF THE FOURTH VOLUME.

T. Daviſon,
White-Friars.

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